

Kew Bulletin

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NOTES ON EARLY KEW AND THE KING OF HANOVER.

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It is common knowledge that Prince Ernest, Duke of Cumberland, the fifth son of George III and later King of Hanover, resided at one time on Kew Green. The older part of the present Herbarium building housing the Library, the Herbarium "Stores" and the residence now known as "Hanover House" at the corner of Ferry Lane all formed part of his establishment. Parts of the original buildings have long since been demolished. Little appears to have been recorded in print concerning the early history of these old buildings and their surroundings, or the changes that have taken place during the two hundred or more years of their existence. Examination of some old records at Kew by one of us (F.N.H.) combined with a close study of the relative history of that period made in this country and on the Continent (G.M.W.) has brought to light certain interesting points which it is thought desirable to place on record.

In order to prevent misunderstanding it may be pointed out that Prince Ernest had lived previously in a house on the south side of Kew Green, namely, that now known as "King's Cottage", nearly opposite the Church. This old house (now a Grace and Favour residence) was for a long period known as "Church House". It is situated to the east of another old building of much historic interest, "Cambridge Cottage", now a museum, an interesting account of which has recently been published by Cotton.

SIR PETER LELY'S HOUSE.

In the latter part of the seventeenth century a series of fashionable residences extended in a westerly direction from the north-west corner of Kew Green, more or less parallel with the river. Of these only the building now known as Kew Palace, formerly called the "Dutch House", survives. Its owners, the Fortreys, were not the only Dutch immigrants to settle here. Sir Peter Lely, the well known artist, had a residence on or near the site of the present Herbarium building. Its exact location, however, does not seem to be known, but it is believed to have been to the west of the Herbarium entrance (Thiselton-Dyer).

Sir Peter Lely had come to England with William of Orange when he married Princess Mary in April, 1641. He acquired the copyhold of the property at Kew from a Mr. Mountney for nineteen pounds per annum, and resided there during the summer months.

Upon his death in 1680, there followed protracted legal complications, as his son John had been born before the marriage and his competence to succeed to the estates was therefore a matter of some doubt. In all these troubles, the family advisor was Roger North, a lawyer son of one of the Lords North, and he served them faithfully. The matter was simplified by the fact that the land was held by copyhold, that is, at the will of the lord of the manor, at this time the Duke of York. The Duke was much irritated by the whole proceeding and finally granted the rights to North himself, who honourably passed them on to his friend and client. John Lely continued to reside by the Green; he was still alive in 1719 when he was nominated in the will of Lady Capel one of the trustees for her intended Charity School.

In the first half of the eighteenth century, previous to 1742, the Lely's house was demolished.

MEYER'S HOUSE.

That indispensable source of local history, Burrell's map, shows that in 1771 the space at the corner of the Green was occupied by a large house (later known as Hunter House) and a smaller house at the corner of and alongside the lane, which also took its name, "Meyer's House", from the occupier, Jeremiah Meyer. Today, these are known respectively as the Kew Herbarium and Library and Hanover House (57 Kew Green), though, as will be described later, the two together formerly constituted "Hanover House" when it became the residence of the King of Hanover.

Meyer was another artist from abroad who had settled in England and enjoyed Royal patronage. He was brought from Wurtemberg by his father in 1749, when he was fourteen. He studied in London and then specialised in miniatures and enamels, bringing himself to the Royal notice in 1761 by winning a prize for a profile of the King which was used on the coinage. Thereafter he painted for the Royal Family and contributed many of their portraits to the exhibitions of the Royal Academy, of which he was a foundation member. He died at his Kew home on January 1st, 1789, from a fever, said to have been the result of waiting in a damp room while enquiring of the King's health. His widow, Barbara, continued to live in the house until her death on April 18th, 1818, when, like her husband, she was buried in the churchyard on Kew Green. It is said she did not have an easy time, having been left with several daughters whom her husband had neglected. One ran away and was brought back by Englehardt, another miniaturist who lived on the Green. At a time when another of them was ill and a rumour had spread that her complaint was contagious no tradesman would deliver at the house.

The present Ferry Lane which runs from Kew Green to the Thames was then called Meyer's Alley and for a hundred years or so after Meyer's death.

HUNTER HOUSE AND ITS OCCUPANTS.

The larger house now forming the Kew Library and Herbarium offices was occupied in 1771 by Mr. Peter Theobald. Not much is known about him, but he seems to have been very wealthy, to have contributed generously to the local charities and played a part in the life of the parish, for he was a churchwarden in 1760 and later a treasurer of the

local charity. Among his benefactions were a regular contribution to the support of the minister and a donation of £200 towards the purchase of a permanent residence for him. Out of gratitude, the Vestry petitioned that he might have three pews annexed to his mansion and estate by faculty. The land to the westward of the house belonged to the Earl of Effingham and after the death of the Dowager Countess, about 1775, it was bought by Theobald to form its grounds. On his death on August 29th, 1778, his widow continued the family tradition of local benevolence and when she died in 1796, a memorial was dedicated to her on the south wall of Kew church. Both the Theobalds lie in the churchyard on Kew Green.

After their death the house came into the possession of the Hunter family and was known as "Hunter House". Robert Hunter was a Scotsman who had come south and became a prominent London merchant. So respected was his judgement that Pitt was in the habit of consulting him on commercial matters. He also gained a high reputation for integrity and public service. When money was granted for the relief of the West Indies islands of St. Vincent and Grenada, after their volcanic and other calamities, Pitt persuaded him to become one of the commissioners and it is related that, though the commission functioned for fourteen years and over £1,400,000 passed through the office, not a shilling was lost, either of principal or interest, when the accounts were wound up, and all this efficiency was attributed to Hunter. He was among the founders of the Marine Society, and, again at the solicitations of others, he became one of the directors of the London Docks, then first projected. Courage was also among his good qualities. On March 22nd, 1769, when London, at the time of the Wilkes riots, was totally in the hands of a murderous mob, he was one of the group of prominent merchants who made their way from the City to St. James' to present an address of loyalty to the King. They had to fight a passage the whole distance and when at last they arrived, they were in rags and covered with dirt, several carriages had been "demolished" and two-thirds of the number were missing. Hunter, however, was one of the stout-hearted who arrived.

His last public work was as a commissioner of the Royal Naval Asylum, a home for the orphans of sailors killed on active service. He married Miss Lowis of London, who died in 1808. He himself died on August 4th 1812, at Hunter House within two months of attaining the age of eighty. He is buried under the south aisle in the church. Hunter is reputed to have been on very friendly terms with the elder Aiton who lived for a time in Descanso House (199 Kew Road), the present residence of the Assistant Director. An obituary of Robert Hunter appeared in the "Gentlemen's Magazine" of 1812 (Vol. 82, p. 406). He had seven children. At the time of his death four were alive, three sons and a daughter.

About this time, we find the inhabitants residing near Kew Green much concerned in local affairs. In 1810, they protested at the digging of a drainage-ditch from the barracks which were on the south side of Kew Green (to the west of Cambridge Cottage) across the Green to the river, via the lane between Meyer's and Dr. Tyrrell's house (i.e. Meyer's

Alley or Ferry Lane). All workmen engaged upon this objectionable innovation were warned that it was at their own peril ! Eventually, a compromise was reached, but, the next year, we find the lane again causing trouble, Dr. Tyrrell being given permission by the Vestry to erect a gate across it to keep out loiterers at night (from old records at Kew Church).

By this time, the two houses at the north-west corner of the Green were attracting the attention of the officials of the adjacent Botanical Gardens. Sir Joseph Banks desired premises for a library of which Mr. Francis Bauer, the famous draughtsman and artist of the Gardens (who lived in a house near the pond at the north-east corner of Kew Green), was to be the first librarian. He urged the Prince Regent to buy the two houses and this was done in 1818. Hunter House was then occupied by Robert Hunter, the eldest of the four surviving children of the original Robert Hunter. Meyer's house was vacant as Mrs. Meyer had just died. Work began on the conversion of Hunter House in 1820 but all that was actually accomplished was the fitting of shelves in the first room on the right on the ground floor (the present "visitors' room") for Banks died and the library project was dropped.

For about ten years the two houses (Hunter's House and Meyer's House) remained empty and unused. They seem to have been the subject of some vague financial transactions for it is stated that George IV sold Hunter House to the nation in 1823. (Thiselton-Dyer). It was not until the accession of William IV that social and political events again brought importance to the houses.

PRINCE ERNEST, DUKE OF CUMBERLAND.

The King's brother, Prince Ernest Augustus, Duke of Cumberland, was a remarkable figure of the history of those decades. Born in 1771 at Kew, the place he loved all his life, he lived a secluded life there until he was 15 when he was sent to the University of Gottingen in Hanover. At the age of 19 he was appointed to a commission in the Ninth Hanoverian Light Dragoons. He was later renowned for his military courage. By nature he has been described as direct, tactless and hard. He represented the principles and traditions which we associate with rural and pre-industrial England at a time when new ideas and developments were changing the face and life of the country. As one would expect, he became the object of hatred and fear to certain circles. His marriage had not been one of those political arrangements which people seem to expect in relation to a Prince, for his wife, Princess von Solms-Braunfels, having previously jilted his brother, the Duke of Cambridge, the Queen would not, as a result, receive her at court. Parliament, at that time ever-ready to seize an opportunity to injure a Prince, especially one such as he, would not allow him the money to be able to live in England, so he had been driven from his native land. Now, however, his brother William IV was more sympathetic towards his wife, and he returned to England, but, here he soon became the victim of a ferocious campaign to drive him abroad again ; hideous slanders, mobbing, were alike employed, but he lacked neither courage nor will-power. On the battlefield, he had, besides receiving a sabre-cut across his face, lifted a French trooper from his horse and carried him back to his lines a prisoner. Now

he resolved, come what may, to settle in England and sent for his wife. It was then that the King gave him for the life of himself and his wife the residence at Kew, i.e. Hunter House and Meyer's House. John Smith, who later became the first curator of the Gardens in the time of Sir William Hooker, witnessed the event and described it. He relates how the Duchess fell on her knees to thank the King. If one remembers what she and her husband had been through during the last fifteen years, one can well believe it. An account of Prince Ernest has been given by R. Fulford and P. Fitzgerald.

At the time the present Kew Bridge was being built, to be officially opened by King Edward VII, accompanied by Queen Alexandra, on 20th May 1903, a writer in a current journal ("Modern Society") in referring to the historic nature of Kew stated, "Those time stained bricks on the front of Hanover House are the same which saw the unwelcomed Duchess of Cumberland descend from the chariot which brought her from Gravesend after her marriage with the youngest and most hated son of George III. Duke Ernest and his bride braved it out with heroic or brazen indifference. The big red [?] house on Kew Green was smartened up, and its stables were filled with the handsome horses the Duke knew so well how to choose. And there, on the top of the wide oak staircase the new Duchess stood glittering with jewels, to receive such of the English great people as chose to be at Hanover House". The fine staircase with its carved balusters has remained much the same as it was then and is believed to be the finest in Kew.

As we have seen, Hunter House and Meyer's House had become one establishment, together forming what came to be called "Cumberland House", the "King of Hanover's House" or simply "Hanover House". Thus the name Hanover House originally referred to the two separate houses, run as one establishment, whereas later, as at present, the name Hanover House was used only for what had been Meyer's House (now 57 Kew Green). It is believed that this house, i.e. Meyer's House, was apportioned to Prince George, the Duke's eleven year old son, and later King George V of Hanover (the Blind King).

A porter's lodge was built in front of the mansion and projected into the road. Its exact location may be seen from the map of 1852 (p. 000). An old photograph showing this lodge, probably taken not long before it was demolished, was reproduced by Cotton in the Journal of the Kew Guild for 1944 (vol. 6, no. 51, opp. page 399). It is apparent that this lodge was situated more or less immediately in front of the present Hanover House, with gates facing roughly east. According to Goldney the lodge was pulled down towards the end of last century on account of the obstruction it caused to the road. The large plane trees now at the side of the road must presumably have been planted subsequent to its demolition and may not therefore be more than about 70 years old.

The stables, coachhouse, glasshouses and other offices of the mansion are said by John Smith to have been beyond what is now No. 1 Conservatory, the present Aroid House, near two large elms.

The Duke and his family dwelt in the mansion for six or seven years, until his accession to the throne of Hanover in 1837. They were not years of great happiness, for, apart from the enmity and malice with

which they were surrounded, it was here that in 1832 his only son became blind (referred to later). The Duke and Duchess were beside themselves in their distress and travelled across Europe seeking medical advice. From then on, medical attendants were kept in residence at Hanover House.

Understandably, the Duke was not fond of London and passed a fairly retired life. He had spent his childhood at what is now King's Cottage, south of Kew Church, and loved Kew, where, at least, he had friends. His name appears on the subscription lists of all the local charities. Princess Lieven, wife of the Russian Ambassador, after dining with the Duke on the 30th September, 1832, wrote to Lady Cowper, "The Cumberlands beg you with all their heart to spend a day with them at Kew. From the terrace you can see the comet, and every night now there is a bright moon".

As King of Hanover, Ernest used often to indulge in reminiscences of his life at Kew, especially as the old faces and scenes disappeared. On the death of his friend, Sir Charles Wetherall, in 1846, he wrote . . . "many and many an hour have I passed with him in a small library I have at Kew, where we used to dine in winter, and have sat conversing and debating with him . . . until two or three o'clock in the morning, totally unaware of the lateness of the hour . . ."

Only nine months before his death, he wrote respecting the detested Industrial Exhibition of 1851, that if he were to visit England, he would not set a foot in Hyde Park, but would instead "remove quietly and enjoy the fine weather and sweet scents of my little cottage at Kew".

By that time, Kew had ceased to be a great political or social centre, and, though it was yet to become world-famous in another sphere, had then quite lost its importance. Ernest was very bitter about the decay of his village, writing at the time of Queen Victoria's marriage "... the country will all be lost and every vestige of monarchy gone. Rapid strides are daily making towards the completion of this. They have already taken away the Guards from Kew, where so much royal property exists; and now I hear they are going to remove me from my rangership there, and to let at Lady-day the deer park to the first bidder, probably a London Radical butcher . . ." (P. Fitzgerald p. 287). On his death, the parishioners of Kew sent an address of condolence to his blind son, who, in his reply, expressed his intention of continuing to contribute to all the local charities as his late father had done, even as King of Hanover.

Hanover House had remained with the family until the death of King Ernest in 1851, though he only visited England once after his accession, in 1843, when he stayed three months. On this occasion he was universally feted, so much so that the jealousy of the Prince Consort was aroused. He coolly showed his German officers over the room in St. James's Palace where, in 1810, an attempt had been made to assassinate him as he slept in bed, but he also took them to places of more congenial memory, for he spent as much time as possible at Kew, including every Sunday during his stay, and so after six years' silence, Hanover House became again the scene of parties, of music and gaiety. But it was for the last time; the King returned and once more the only inhabitants of the house were his caretakers.

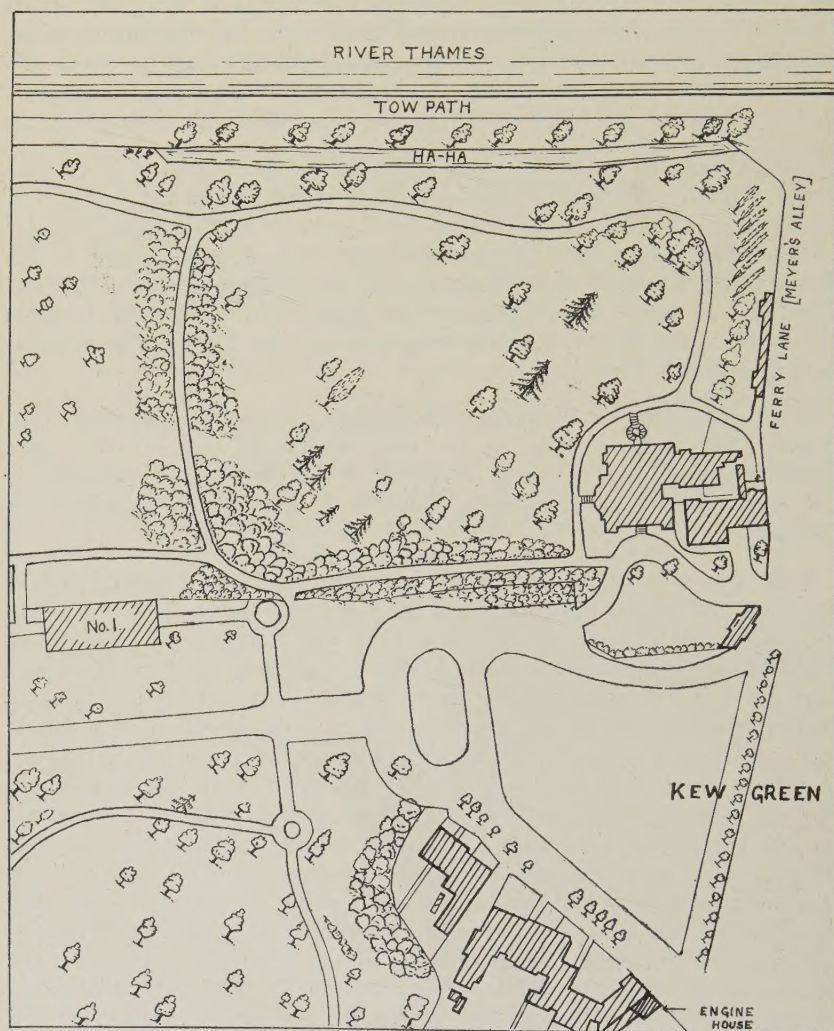
It would seem that the garden and grounds surrounding the house were maintained in good condition while the Cumberlands were in residence. The wife of the Prussian ambassador Heinrich von Buelow, writing to her sister (10th May 1833) remarked, "I really reproached myself when I was walking last Sunday morning in the Duchess of Cumberland's garden at Kew (as she is still at Hastings I have permission to go there whenever I like), enjoying the charm of the place in its attractive spring dress and moved, as I always am, by the glorious works of God in nature; I imagined the poor Duchess's feelings when she returns to find everything in her garden fresh and blooming, and knows that her beloved child can see little or nothing of all this beauty".

With regard to the actual date when the Cumberlands took up residence at Hanover House it is of interest to recall that in the columns of the *Times* of 1831 it is recorded that the King went in his carriage to Kew on 17th September, 1831, to see the improvements being made at the house and that on the 17th October, 1831, the Duchess gave an "elegant dejeuner" at the "new residence" in honour of the Grand Duchess Helen of Russia, also that among the guests were the Prince of Wuertemberg and Prince Lieven.

A copy of a letter in an old file in the Registry of the Gardens, dated 11th August 1847, indicates that, at that time, the House, or parts of it, were showing serious signs of decay. The letter was presumably intended for the representative of the King of Hanover in this country and reads as follows :

"On behalf of the Commissioners of Her Majesty's Woods I am to acquaint you for the information of the King of Hanover, that according to reports lately made to this Board by the Surveyor of Works and Buildings and by the Clerk of the Works in charge of the Kew District it appears that the mansion near Kew Palace, occupied by the King of Hanover, when last in this country, and now in charge of some house servants is most seriously affected by Dry Rot, which is very apparent in various parts of the building, but that the extent cannot be ascertained, nor the cost of repairs estimated without such investigation as would involve the temporary removal of much valuable furniture in the first instance and the subsequent removal and renovation of all such portions of woodwork, fittings and furnishings as are either destroyed or materially damaged by the disease, that the execution of these works would necessarily require the redecoration of some of the principal apartments the whole cost of which would be very considerable, and that this Board having no authority to incur expense upon the mansion in question, nor any available funds for that purpose, feel it their duty to apprise you of the circumstances in order that you may communicate the same for the information of the King of Hanover and that His Majesty may make any provision or give any direction for the preservation of this building, and the furniture and property therein, which to His Majesty shall seem fit".

In 1850, the King of Hanover's Kew residence was associated with an interesting event, for in July, his brother, the Duke of Cambridge, died and as Cambridge Cottage was under repair at the time of the funeral,

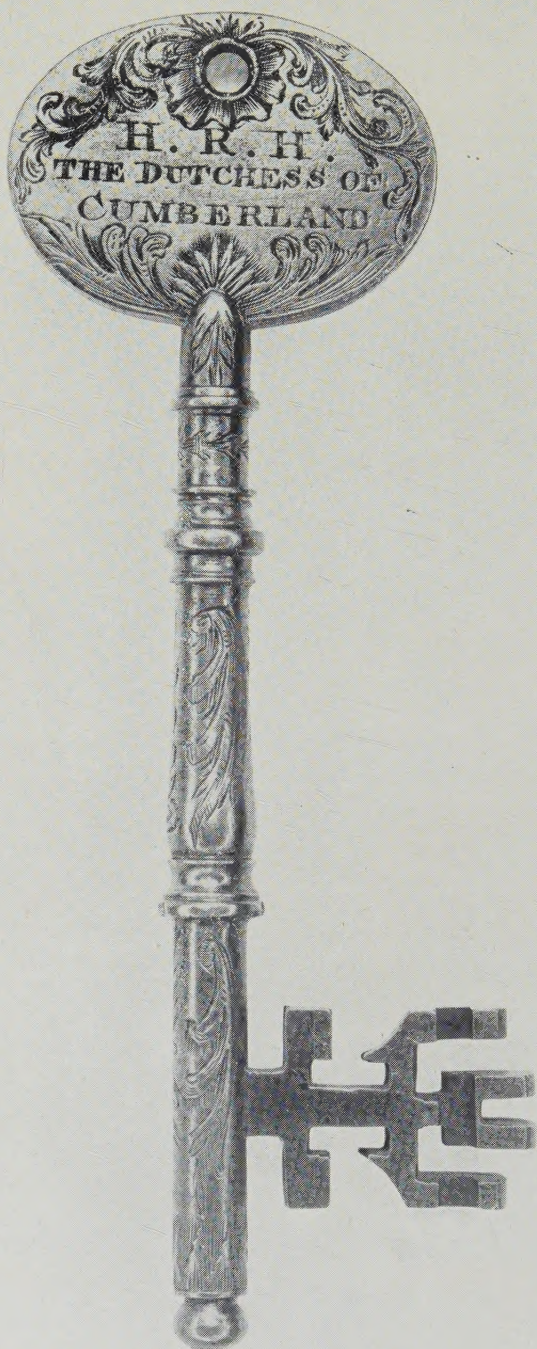


Reproduced from "Map of the Royal Gardens and Pleasure Grounds at Kew. 1852.
(prepared by Day and Son, Lithographers to the Queen)."

PLATE 1.



H.R.H. Prince Ernest, Duke of Cumberland and King of Hanover.
Reproduced from a German portrait (by Oesterley) which was presented by the King
of Hanover to Sir William Hooker in 1846.



The "Personal Pass" key to the Royal Botanic Gardens, Kew, which belonged to the Duchess of Cumberland : now in the Museum at Kew. Note the unusual spelling of the word Duchess.

PLATE 3.



The New Herbarium as it was at the latter part of last century before the addition of the Second Wing. The photograph clearly shows that part of the adjoining building ("Herbarium Stores") once used as a residence and later demolished to reduce fire risk to the Herbarium (now an old unlabelled photograph by Mr. Fred Turner, F.R.Hist.S., Brentford, and restored by Mr. G. Atkinson, Oct. 1949).

the mourners assembled at Hanover House, among them the Prince Consort, the Duke of Wellington, Lord Palmerston and Sir John Russel.

The next year, on the 18th November, King Ernest Augustus himself died. The house reverted to the Crown and his hatchment, now preserved in the church on Kew Green, must have been his last personal link with it.

In the churchyard, there is another reminder of his local associations. Before becoming King of Hanover, the Duke of Cumberland was Colonel for many years of the 15th Light Dragoons (later 15th Hussars), in which he took a keen interest long after he had relinquished the appointment. A sergeant of the regiment lies buried on the north side of Kew church. The greater part of the inscription on the gravestone is still legible, but the bottom portion has weathered with age and fallen away. As it may not be legible much longer it seems desirable to reproduce it. It reads—“Here lies the Body of James Harper formerly Sergeant in the 15th Regt. of Hussars, and many years in the Service of His Royal Highness the Duke of Cumberland. He departed this Life on the 14th day of August 1839, in the 60th Year of His Age. This stone was erected by the King of Hanover, to accord His Majesty’s regard for the Memory of a bold and dutiful Soldier—Honest, Zealous” (the last few words of the inscription have unfortunately disappeared).

That as a King in far-away Hanover, Ernest Augustus should have remembered this humble sergeant and, hearing of his death, provided a gravestone with an epitaph written by himself personally testifies to his deep and undying attachment to those who had served him. To anyone who has read the Duke’s correspondence the style of the inscription is instantly familiar.

JOHN SMITH’S ACCOUNT OF CHANGES AROUND KEW GREEN.

After the death of George III in 1820 various changes took place on the ground which is now represented by the extreme western portion of Kew Green, i.e. the ground immediately in front of the original Hanover House. An interesting account of these changes has been given by John Smith, the first Curator of the Gardens, in his manuscript on the early history of the Gardens. This manuscript is now preserved in the Kew Library. As it was not received at Kew until 1913 (vide Kew Bull. 1913, p. 62 : 1914, pp. 85–6) it is probable that earlier writers on the history of the Gardens (e.g. Thiselton-Dyer 1891 : Bean 1908) did not have access to it. It may be desirable to give John Smith’s account of the changes, which took place after 1820, in his own words. The account was probably written about 1880, long after his retirement, from notes collected during his long career.

He started work at Kew, as he states, “in the spring of 1820” under the directorship of William Townsend Aiton who had succeeded the elder Aiton in 1793. For 18 years he was “foreman” of the Gardens and was officially appointed Curator in 1841, the same year in which Sir William Hooker was appointed Director. He was superannuated in 1864 when his eyesight was failing, having served the Gardens for 44 years. He appears to have lived many years in retirement at Kew.

In his manuscript John Smith states :—

"On the death of George III in 1820 the Prince of Wales, who had for several years been Regent, became King as George IV, and considerable alteration took place in the garden and especially with regard to Kew Green, at that time the west end of which formed a narrow neck extending westward bounded by the Palace garden wall which then ran from the back of the Palace stables northward to the river.

In the south this narrow part of Kew Green was bounded by the wall of the original arboretum, which ran in a nearly south-westerly direction from the west end dwelling house (now, 1880, occupied by Professor Oliver) terminating at the Palace stables (now the cloakroom).

On the north by a wall running nearly parallel with that on the south which separates a portion of the Green from the mansion and grounds of Mr. Robert Hunter, which extended northward to the river, these two walls were each bordered by a row of trees planted by George III, that on the south by horsechestnuts and on the north by limes. They formed fine promenades for the parishioners. One was called the Chestnut and the other the Lime tree walk. Several trees of each row and a part of the north wall still remain (1880).

In 1818 the mansion and grounds of the late Robert Hunter were purchased by George IV as also the two adjoining houses for the purpose it is said of making it an occasional summer residence. It was to be called the King's Lodge, and on the recommendation of Sir Joseph Banks there was to be a library of botanical books formed and an herbarium, but on the death of Sir Joseph Banks in 1820 and some other causes the formation of the library was given up and the house remained unoccupied during the lifetime of George IV and nothing was then done to the house except keeping it in repair.

The grounds consisted of about $[6\frac{1}{2}]$ acres divided into two parts, that next the house being planted with cedars and rare trees. The other containing a row of glass houses consisting of a greenhouse in the centre with the vineries and a peach house on each side as also a kitchen garden and orchard next the river. In order to make the property private the King in 1821 obtained an Act of Parliament which authorized the inhabitants of Kew to cede the narrow portion of Kew Green to the Crown in return for which the school house was erected [King's School, Kew Green], the Green enclosed and privileges granted and improvements made in the Parish.

In 1822 the newly acquired Royal property was separated from the public Green by a high iron railing which stretched from the buildings on the south side (from what is now the engine house) across the Green and terminating at the top of the road that leads to the river. In the centre of the fence was a carriage gate and a lodge on each side of it, and a stone figure of a lion on the one and a unicorn on the other. A border of thick shrubbery was planted inside the railings and on the public side a row of lime trees was planted and a gravel walk made and it formed a nice promenade for the parishioners (the trees, walks and wire fence still remain, 1880).

At that time the public entrance to the Botanic Garden was by a small wooden door in the arboretum wall near to where the walk turns off

to the left just within the present entrance and the entrance to the pleasure grounds was by a door in the same wall.

In consequence of the enclosure of this part of the Green these two entrances were done away with, and a new entrance to the Botanic Garden made on the ground now occupied by the engine house and part of the space at that time occupied by barracks [the area to the west of Cambridge Cottage]. This new entrance consisted of two gates, one door (where the engine house now stands) for the public, the other a double door for workmen and carts. The pillars of the gates were of substantial hewn masonry, the doors being of oak; these gates were conspicuous on entering Kew by the Bridge. This entrance was consequent on the original plan not being carried out which was that the row of houses now the Director's, Curator's and others to be taken down as also the north wall of the arboretum, thus adding the newly acquired piece of Green and the space occupied by the house and their gardens to the arboretum (still in its original state, 1880), and that portion in front of the Royal Lodge was to be ornamentally laid out. These alterations were planned by Mr. Aiton, the Director, and approved by George IV with whom he was a great favourite, but at the last moment court influence prevailed with the King and prevented the houses being taken down.

A carriage road was formed through the centre of Kew Green, the public road having swing gates hung on low strong pillars, this road passed between the two lodges and on to the palace. It was formally opened by George IV as also the new entrance to the Botanic Garden.

Although these changes took place nevertheless nothing was done during the reign of George IV to add to or improve the Botanic Garden in consequence of part of the money allowed for the maintenance of the Botanic Garden being required by George IV to make improvements in the cottage grounds at Windsor Park. The hothouses and buildings were, however, well maintained and improved by the Board of Works who had a separate grant of money for such works.

I now come to speak of the alterations and improvements that took place in the reign of William IV [1830–1837] who was fond of Kew, to which while Duke of Clarence he paid frequent visits and took much interest in planning and suggesting improvements of what he would like to see done in the Gardens, and was not pleased with what George IV had done, especially in taking down the palace erected by their father, enclosing the portion of Kew Green and building the lodges on the Green. In becoming King in 1830, it was not long before he visited Kew and one of his first acts was to present the house (the Royal Lodge purchased by George IV) [in turn Hunter, Cumberland or Hanover House] to her Royal Highness the Duchess of Cumberland, for her life, and the same day he gave orders that the iron railing and two lodges put up by George IV should be removed, which was shortly afterwards carried into effect, and the iron railing was put further back so as to exclude the houses on both sides and leave the approach to them open to the Green.

The road through Kew Green was broken up, and the carriages to the palace, Royal or otherwise, had to go by the road to the river and along

the riverside. He also used part of the railing for enclosing a portion of the ground in front of the house, now the Duke of Cumberland's, in order to make it private, and he erected a porter's lodge. The row of lime trees and the walk were also intended to be done away with and all vestige of fence ever having been there to be removed, so as to again restore that part of the Green to the parish. The walk was begun to be picked up, but a trifling incident on the part of the Duke of Cumberland caused its stoppage, and as no further notice was taken of it, the picked up part was made good and since then it now remained (1880) as it was then, and nothing has been done with the enclosed piece of Green and the portion of ground between the houses has remained unoccupied".

The lime walk referred to in the last paragraph is now represented by the footpath that runs across Kew Green at its western end, from north to south, near the Main Gates, and often referred to as "bird cage walk". It is still planted in the main with lime trees, although these are of various ages. It is probable that the four largest of these trees at the south end are the remainder of the original lime walk planted at the instigation of George IV in the early part of his reign, in or about 1822. The average circumference of these five trees at breast height is now (Aug. 1949) 6 ft. 8½ ins., which is compatible with the trees being of this age, having regard to their growing in what is naturally a poor gravelly soil.

At about the middle of this lime walk stood the main entrance gates to the Gardens with their two imposing lodges which were erected by George IV (already referred to in John Smith's narrative). The position of these gates may be indicated by the present low iron fence that runs along the walk on the east side, for it may be observed at the present time that in about the middle there is a length of fencing that differs from and is not in alignment with the remainder of the fence.

The gates were not destined to remain for long as William IV did away with them soon after coming to the throne. The lion was later erected on the Lion Gate and the unicorn at the Unicorn Gate in the Kew road. There they have remained up to the present day.

The changes that took place to the approach of Hunter House or the original Herbarium building when it became the residence of the Duke of Cumberland, to be known as Cumberland House and later Hanover House, have already been outlined. Important features were the amalgamation of the corner residence, what was Meyer's House or the present "Hanover House" with Hunter House, and the establishment of the porter's lodge already referred to.

TRANSFORMATION OF THE ORIGINAL HANOVER HOUSE INTO THE PRESENT HERBARIUM AND LIBRARY.

A study of the 1852 map (opposite p. 000) reveals some interesting points. The extent of the original Hanover House grounds, now represented in the main by what was until recently the "Herbarium meadow", was about 6½ acres. They adjoined those of the Palace Gardens although the boundary between the two does not appear to be clearly defined on the map. John Smith in his unpublished notes describes the existence of "handsome and rare trees" in the ornamental part of the grounds near

the mansion and refers to cedars. Probably some of the fine cedars still in the grounds existed at the time of the King of Hanover as young trees.

The ha-ha along the tow-path at the back of the Herbarium buildings⁹ so clearly shown on the map, has long since been demolished. It was probably replaced by the present brick wall. There would seem to be fairly good evidence that the wall was in existence in 1877. One of the older employees in the Gardens (Mr. F. G. Frost), whose father worked in the Gardens before him, states that his father had told him he remembered the ha-ha there.

With regard to the buildings, the changes that have been made to the original Herbarium building since the days of the Duke of Cumberland or King of Hanover are very obvious on glancing at the map. We are told that after the death of the King of Hanover in 1851 the house continued to be unoccupied. This map of 1852 therefore probably depicts the layout of the mansion as it was in the King of Hanover's time. The most striking feature is perhaps the extent to which the main building stretched towards Ferry Lane, behind the "Herbarium Stores" and the present residence of Hanover House. This part of the building probably constituted the domestic quarter, kitchen, servants' quarter, etc. It would seem that the main building was not completely connected with the Herbarium stores and present day Hanover House as is often supposed, but that there was a gap or passage way between them, possibly a servicing road or path.

A large old mulberry tree exists on the lawn at the back of the present day Hanover House. An old resident of Kew (a Mr. Jurd, recently deceased) who lived in the present Hanover House as a boy, when his father was Clerk of Works, stated that he remembered climbing on the roof of a building in order to pick the mulberries. There is no such building at the present time but doubtless the building referred to is that shown on the 1852 map, i.e. the long narrow structure running parallel with Ferry Lane with its southern extremity near the bay window of the north living room of the present Hanover House. At that time there was also a long narrow building against the high brick wall that separates the garden from Ferry Lane. This may have been an out-house of some sort, long since demolished.

It has already been pointed out how, in 1818, at the suggestion of Sir Joseph Banks, who was friendly with George III, Hunter House was purchased by the Crown with a view to using it as a herbarium and library for the Botanic Garden. What is now the "visitors' room" in the Herbarium had shelves fitted round it for the purpose but as Sir Joseph Banks (and George III) died in 1820 the project was dropped. The building appears to have been unoccupied until about 1830. After that it was in the hands of the Duke and Duchess of Cumberland until the former's death in 1851 as already stated. Actually they only resided there until 1837 when the Duke became King of Hanover. On the death of the King of Hanover Queen Victoria granted the ground floor of the house to Sir William Hooker to house his own herbarium and library. There was no national herbarium, however, until the following year when Dr. Bromfield's library and herbarium were presented by his sister to the

Establishment. From that time onwards the building became known as the Kew Herbarium and it housed both the Library and large collection of herbarium specimens.

The first wing ("C wing") was not built until 1877. In referring to this John Smith states, "The interior of the house was re-modelled, the dining room and back pulled down and the Herbarium gallery [i.e. the "Wing"] erected". Presumably, therefore, the dining room was a room which stood where part of "C wing" now stands. The rooms which extended to the east (see map opposite p. 000), at the back of what is now the Herbarium Stores and the present Hanover House, may have been pulled down at the same time (1877). The porter's lodge, already referred to, may have been demolished then or later, probably later. The other two wings of the Herbarium ("B wing" and "A wing") were completed in 1902 and 1932 respectively. Previous to 1932 Wings "C" and "B" were referred to as the "old" and the "new" wing.

Conditions in the Herbarium and Library, housed only in the old building or Hunter House, must have been very crowded before the first Wing was built in 1877. Even in 1904 when Mr. A. D. Cotton, for many years Keeper of the Herbarium, first came to Kew, he remembers there was much congestion in both the old part of the building and the Wing. On the ground floor of the latter there seemed to be cabinets everywhere, and as far as he recollects there were no sorting tables. Certain groups were still kept in the old house in addition to the library. What is now the visitors' room, which was then occupied by Mr. Masee, housed the Lower Cryptogams, the Algae and Lichens being in the small adjoining room to the east. The Ferns were kept in the present Keeper's room. Actually at that time it was hardly a room, as the partition had not been built and there was a through-way from the hall to the wing. There must have been, previous to 1902, a much finer view towards Kew Palace from the two bow-windowed rooms facing west, for the second wing ("Wing B") and the corridors connecting it had not been built. This is apparent from the old photograph opposite page 000.

Dr. T. A. Sprague in his reminiscences (unpublished) of working conditions in the Herbarium between 1900 and 1906 states how the preliminary sorting of a large incoming collection had to be done in the cellars of the Herbarium as there was not sufficient space elsewhere. At that time, before the erection of the second Wing "Space in the herbarium cabinets was so strictly limited, that I remember being mildly hauled over the coals by the then Keeper (W. B. Hemsley) for laying out more than one sheet of a Costa Rican species which I could not identify, and which, years later, was described as new. With respect to old species, one was supposed to look through the covers to find a half-sheet, on which part of the new specimen could be mounted, the remainder being treated as a duplicate. Unfortunately Augustine Henry's earlier Chinese collections had suffered in this way, many numbers (of which he told me he had collected ample material) being accordingly represented at Kew by mere scraps, or even distributed as duplicates under the impression that they were previously described species. Accommodation in the cabinets was severely cramped until the provision of the new building (Wing B). In laying in, one had often to divide a cover of specimens into

two, and shift the covers through one or more pigeon-holes, or even through an entire cabinet, in order to get the new material in.

Once a quarter we had the "quarter's sorting" of freshly mounted sheets, which for some years fell to my lot, as the junior member of the staff. This formed a most valuable training, by which one learnt the facies of the chief families of seed-plants and of many genera. Laying-in of the material was done by the Assistants (a title subsequently altered to Botanists) themselves, who in this way acquired a general knowledge of the groups under their charge which they could not have gained in any other way. I was responsible for the Thalamiflorae, Rolfe for the Calyciflorae and Orchidaceae, N. E. Brown for the Gamopetalae and Apetalae, and C. H. Wright for the Monocotyledons (except the Grasses) and the Pteridophyta. Stapf dealt with the Grasses. Skan had charge of the Library under Hemsley.

All Herbarium correspondence was in longhand; there was no Clerk, no typewriter, and no system of "tags" in the Herbarium.

When I entered the Herbarium in 1900, Stapf was the only other member of the staff with a degree, apart from I. H. Burkill and H. H. W. Pearson who worked largely in the Director's Office, under Thiselton-Dyer. We all had to work much harder than the present staff. The pay of Assistants in the Herbarium was then so low that only those with a real love of systematic botany joined the staff. It was £80 per annum with a £10 increment. I should have been unable to exist on it but for an allowance from my father which for some years exceeded my salary. Some years later the initial salary was raised to £150, but those who had borne the burden and heat of the day did not reap the benefit".

Inspection of the older part of the Herbarium building shows that two distinct periods are represented in the ornamentation, particularly in the ceilings, that in the visitors' room, the hall and the office being older than that on the first landing, which must have been modified with the alteration of 1877.

The Duke of Cumberland (before becoming King of Hanover) was colonel of the 15th Light Dragoons (later 15th Hussars) and it is said that his officers met regularly at Cumberland or Hanover House. The house may therefore have witnessed many gay or convivial gatherings in those days.

Most old buildings have their ghosts. That Hunter or Hanover House is no exception would seem to be established from the following remarks from the diary (31st July 1834) of the Duchess of Dino, wife of the French Ambassador. "In our drawing room the conversation turned on the talent of certain people for telling ghost stories. This reminded me of the interest with which two years ago at Kew I heard from the Duchess of Cumberland the story of an apparition seen by herself, the remembrance of which seemed to cause her much emotion. The impression she produced on me was the deeper as the hour was late and a terrifying thunderstorm was raging outside the house".

AN OLD KEY.

An interesting relic of the days of the Duke and Duchess of Cumberland at Kew exists in one of the Kew Museums in the form of an old key

which was apparently a personal key of the Duchess of Cumberland to enable her to enter one of the gates of the Gardens. It was presented to the Museum in 1919 having been acquired by a member of the Gardens staff (Mr. A. Osborn). This key, which is much ornamented as was the custom of those days, is in a remarkably good state of preservation, and appears to have suffered little with the passing of the years. A photograph of this key appears opposite page 000. It will be noticed that it is engraved "H.R.H. The Dutchess of Cumberland", the unusual spelling of the word Duchess with a "t" as "Dutchëss" being worthy of attention. It was at first thought this may have been an error on the part of the engraver but it has now been ascertained that this rendering was not unusual at that period. A note accompanying the key states that it "was known as the 'Personal Pass' key of H.R.H. The Duchess of Cumberland and was used by that lady to enter the Gardens when she lived in Hanover House, Kew Green. When the family left the house the key came into the possession of Mr. Williamson, Curator of the Richmond end of the Gardens. It was found among his possessions at his death". Two other old keys of the Gardens in use about the same time are also in the Museum (see Kew Bulletin 1914, p. 89).

THE PRESENT DAY HANOVER HOUSE.

The residence now known as Hanover House at the corner of Ferry Lane, has been one of the official residences of Kew Gardens and occupied by senior members of the staff since the early years of the present century. Prior to that it had for many years been occupied by officials (clerks of works) of the Ministry of Works, or Board or Office of Works, as it was formerly called.

One of us (F.N.H.) is able to account for the occupants of the house during the last eighty years or so, but there is a gap from 1851, when it ceased to be in the possession of the King of Hanover on his death, to the time it was occupied by Mr. Jurd (who preceded Mr. Allen as occupant) possibly between 1860 and 1870. Other "Clerks of Works" may have occupied the house during this period or it may have remained empty for some time. The house has been occupied in turn by Messrs. Jurd and Allen (Office of Works), O. Stapf (Herbarium), J. M. Hillier, W. Dallimore, J. Hutchinson and F. N. Howes (Keepers of Museums).

Allen is reputed to have come to Kew in 1879, having been brought specially to take charge of the reglazing of the Palm House and other houses after the terrific destruction caused by a freak hail storm in that year when "the hailstones averaged 5 inches in circumference and descended with such violence as to bury themselves in the ground" (Kew Report 1879). Allen occupied the house for about 20 years and vacated it to live in one of the official houses near Kew Palace. It was then occupied by Dr. Stapf, who was Principal Assistant in the Herbarium at that time. When he moved to Herbarium House across Kew Green, on the retirement of Hemsley as Keeper of the Herbarium, the Keeper of Museums (Mr. J. M. Hillier) was given the residence. It is said that before Hemsley lived in Herbarium House he had lived in the house adjoining Hanover House, now the "Herbarium Stores", presumably before a portion of it was demolished in order to lessen fire risk to the Herbarium. A good idea of the original building may be obtained from an old photograph reproduced opposite page 000.

It is stated that Allen, who had a large family, installed the bathroom while he occupied the present Hanover House, by partitioning off one of the top rooms, and that the house was the first of the official residences at Kew to possess such a luxury. Subsequent occupants of the house have always lamented the fact that Allen chose the second or top floor for the bathroom! However at that time bathrooms were far less general than they are now. When Allen occupied the house the garden ran almost to the river—to the wall near the tow path, and included the area now occupied by buildings of the Commonwealth Mycological Institute. He is reputed to have erected a staging against the high brick wall at the end of the garden so that he and members of his family or their friends could sit and watch passers-by and activities on the Thames. The older fruit trees in the garden are said to have been planted by him. These include a very large *Blenheim Orange* apple tree, also a *Devonshire Quarrenden* and a *Fearn's Pippin*, all of which still (1949) bear good crops of apples although the last mentioned is now showing signs of age and the adverse effects of several years of neglect. The remaining fruit trees at present in the garden were planted by Mr. W. Dallimore in the early years of his occupation of the house (1925–30).

Various internal alterations have been made to the house and it has been modernized in many respects, although it is fundamentally the same as it was last century. The most notable of the alterations is probably the recent (1949) building of a proper kitchen on the ground floor by reducing one of the living rooms, in order to eliminate the use of the basement kitchen. Modern, more efficient fireplaces in the main rooms have replaced those of Victorian times.

THE DUKE'S BLIND SON.

It is generally considered that in the Duke of Cumberland's residence the building under discussion (the present day Hanover House) was probably used for the establishment of his son who later, on his father's death, became George V of Hanover or "the Blind King of Hanover". It would seem not unreasonable to suppose, therefore, that the boy spent a good deal of his time in the garden or the immediate precincts of this house, and it may have been here that the accident took place that robbed him of his sight.

He was a brilliant and handsome boy, and much-liked, but he was not always spared by his father's political detractors, one of whom, Greville, wrote of him, when he was ten years old, "The Duke of Cumberland's boy, who is at Kew, diverts himself with making the guard turn out several times in the course of the day to salute him".

About the same time, however, his studies were hampered by the loss of the sight of his left eye, generally attributed to the hereditary weakness of sight of George III's family. He was warned to be very careful of the other, but, alas, he was too full of youthful energy to take much heed and one day, while playing, he met with an accident that rendered him completely and permanently blind. During his lifetime, little was said on the subject and there were many speculations as to the cause of the misfortune. After his death, however, several eye-witnesses revealed the nature of the accident, their accounts differing only in that one described

the flower-garden at Windsor as the scene of the event and the rest the garden of the house at Kew ; the latter has always been accepted as the authoritative by Hanoverian historians.

Apparently, the Prince was playing with his cousin, Prince George of Cambridge, carrying a long green silk purse, intended for the collecting of alms. It was decorated at either end with large gold tassels in the form of acorns and already, as he swung it in the air, one of these had only narrowly missed his face. He was immediately warned to be very careful of his eye, but he laughed at such anxiety, swung the purse again and it struck him heavily in the right eye.

The next day, the pain was such as to prevent his taking his usual exercises and doctors were called. They pronounced the dread truth ; the Duke, who would never despair, refused to believe them and took his son immediately to Berlin to the renowned specialist, Dr. Graefe. He had previously saved the Duke's sight, but now he could only confirm the opinion of the English doctors.

The exact date of this accident is fixed by a letter of Princess Lieven, who writes on the 15th September, 1832, "I found the Cumberlands yesterday in the most dreadful despair. George has suddenly gone completely blind. They put him in the sunlight, but he could see nothing at all. Can you imagine a more terrible misfortune for his parents? He has now been four days in a state of complete blindness! The doctors, whom I found assembled at the house, give some slight hope, but I do not think Halford [Sir Henry Halford, the King's Physician] holds any. What a tragedy!"

FERRY LANE AND THE KEW EYOTS.

Ferry Lane, or Meyer's Alley as it was long called, was probably little more than a track or right of way, connecting Kew Green with the towing path, until about 1823, when it was made into a proper carriage way by the Commissioners of Woods and Forests. At the Records Office, Chancery Lane, there is an agreement, dated 7th September 1823 (Ref. *Works* 16.31.2), by which Timothy Tyrrell (of the Guildhall, London) and Elizabeth Crutchley, who owned the small meadow through which the lane passed, agreed to relinquish all right to the strip of land constituting the lane on its being made into an improved public way, provided a boundary wall similar to an adjoining one be erected. Doubtless the wall then erected is the same wall that exists at the present day, having been altered or rebuilt in places. At about this time special funds (£650) had been provided "for making up an embankment as a carriage road and towing path by the side of the River Thames at Kew". This was no doubt necessary as a result of the closing of the direct road to the Palace across Kew Green by George IV already referred to.

A landing stage "Hunter's Wharf" existed near the northern end of Ferry Lane at one time. Robert Hunter also had an interest in one of the Kew eyots (the lower one—then known as "Twig Eyot" or "Makenshaw island") which was later acquired by the Crown. According to old documents at the Records Office (Ref. *Works* 19.17.2) the Kew eyots seem to have been the cause of a good deal of contention at about this time. In 1830 a petition from the inhabitants of Brentford, with 28

signatures, was sent to the King asking that the osiers on the lower island be cut back, as they were with the former owner, for their growth prevented free circulation of air and encouraged the use of the island as a resort for thieves and for improper practices. The official reply was to the effect that it was desirable to have tree growth on the eyots in order to screen the ugliness of Brentford from Kew. At that time there was a cottage on the lower eyot occupied by a garden labourer, John Farr, said to be employed at Kew Gardens. It was recommended that a similar cottage be built on the upper eyot "to be occupied also by a respectable married man" and "charged to warn off all strangers attempting to land on the eyot". It was also recommended that the site of the proposed cottage be raised 4-5 feet to allow of spring tides and that "the osiers be thinned out to form a central pathway from end to end for convenience of perambulation and circulation of air". The recommendations do not appear to have been carried out, or the cottage on the upper eyot erected.

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Hardy Trees and Shrubs*—Few books on gardening can have met with such popularity as W. J. Bean's "Trees & Shrubs hardy in the British Isles". Scarcely a week goes by without reference to it in the gardening press as an ultimate authority in all matters relating to trees and shrubs. It is, in fact, a veritable horticultural "bible". It is a popularity that is well founded, not that a few notes cannot be found in the wisdom set forth in its pages. Everywhere plant lovers will welcome the first volume of the seventh edition, which its venerable author completed shortly before his death.

This edition is more than a reprint, as recent introductions and tender species, formerly included in the third volume, are now correctly placed in the alphabetical sequence. A few additional species also have been added. An unwelcome innovation is the placing of the photographic plates in one block at the end of the volume, instead, as hitherto, of interlarding them at appropriate places within the text. The botanical nomenclature is not invariably in accordance with the international rules, although the correct name is usually given as a synonym. There are a few errors such as mention of "four following" species of *Abies* (p. 118) where five are described, but these are only the notes referred to above. Until the remaining volumes are published, it is a convenience to have the temporary index for the first volume, but it is hoped that the appearance of the other two will not be long delayed.

R.M.

*Trees & Shrubs Hardy in the British Isles : by W. J. Bean, Vol. 1, A-E, pp. xviii + 703, tt. 40 : London, John Murray 1950, price 42/-.

STIPA HOOKERI STAPF.

N. L. BOR.

Stipa hookeri Stapf (sect. *Lasiagrostis*) was published by the late Dr. O. Stapf in the Journal of the Linnean Society, **30**, 120 (1894). The specimen upon which this name was based is Thorold's no. 124 from Central Tibet and the type sheet is at Kew. The label reads "Thibet July-Sept. 1891. Coll. Surg. Capt. W. G. Thorold. No. 124. 14800 ft. Sheltered nullahs near water".

Stapf's description of the panicle and spikelet is reproduced here. "*Panicula* angusta, subcontracta, 4-6 poll. longa, ramulis pedicellisque brevissimis ad 1 lin. longis, asperulis. *Glumae vacuae* subaequilongae, lanceolatae, acutae, tenues, 3-3½ lin. longae, glabrae; fertilis lanceolata, vix 3 lin. longa, apice ad 1/3 bifida, lobis setaceo-acuminatis, inter eos aristata, 7-nervis, tota longe et patule pilosa, arista vix torta, geniculata, asperula, 4-5 lin. longa".

The description of *S. hookeri* Stapf in the Flor. Brit. Ind. **7**, 232 (1896) differs from that of Stapf in the important respect that no reference whatever is made to the long setaceous lobes at the top of the lemma. These setae are firm and hard and represent the fusion of the two lateral nerves on either side which are carried out as two firm, sharp, scabrid points. This suggests that Hooker based the description in the Flor. Brit. Ind. partly, at least, on some other plant. Hooker quotes the following sheets from India as representing *S. hookeri* Stapf.

- (1) Western Tibet; in wet places, alt. 10-14000 ft., Jacquemont.
- (2) Nubra, Thomson.
- (3) Tibetan Sikkim, alt. 15-16000 ft., J.D.H.

Taking no. 3 first, it may be said at once that this matches Thorold's sheet in every respect and is therefore *Stipa hookeri* Stapf. Nos. 1 & 2 represent a species which differs from *Stipa hookeri* Stapf in the very effuse panicles, smaller spikelets, in the tip of the lemma being 2-lobed but not 2-aristate, and in the finer texture of the glumes. It is very obvious that Sir Joseph Hooker drew up from one of these sheets the description which appears in the Flora of British India. The grass on these sheets appears to be *Stipa splendens* Trin. et Spreng., Neue Entdeck. **2**, 54 (1821).

This is, however, not the only complication. In the Journal of the Washington Academy of Sciences **23**, 134 (1933), Hitchcock described a new species of *Timouria* to which he gave the name *Timouria aurita* Hitch. This grass, Koelz no. 2328, was collected in sand at Kuzil, Rupshu, Kashmir, at about 4300 metres on the 16 July 1931. It differs in no respect from Thorold's specimen upon which Stapf based *Stipa hookeri* and the name *Timouria aurita* must therefore be relegated to the synonymy of this species.

An amended and extended description of *Stipa hookeri* Stapf follows.

Stipa hookeri Stapf in Jour. Linn. Soc. **30**, 120 (1894). Syn. *Timouria aurita* Hitch. in Jour. Wash. Acad. Sc. **23**, 134 (1933).

A perennial grass with thick roots and rhizomes covered with overlapping, coriaceous, shining, glabrous, striate cataphylls. Culms up to

70 cm. tall, clothed at the base with the leathery remains of old sheaths, smooth or minutely scaberulous, glabrous ; innovations intravaginal. *Leaf-blades* strongly involute, setaceous, opening in old age and flattening out, linear, tapering to a firm setaceous point, pale green or glaucous in colour, 10–35 cm. long, 5 mm. wide, minutely scaberulous on the upper surface, rough on the margins, smooth below ; *sheaths* of the culm longer than the internodes, overlapping, clasping, minutely retrorsely scabrid, striate, glabrous, the lower and those of the innovation shoots very loose, flattening out, leathery, shining, markedly striate, persistent ; *ligule* short, membranous to chartaceous, about 2 mm. long, irregularly lacerate at the top, minutely ciliate on the teeth.

Inflorescence a narrow, pale, purplish panicle the lower part of which is frequently enclosed in the mouth of the uppermost leafsheath, up to 16 cm. long, by 3 cm. broad, seated on a minutely scabrid and glabrous peduncle ; branches slender, ascending, naked in the lower half, branching and re-branching, scaberulous ; lateral pedicels very short, scabrid. *Spikelets* gaping at anthesis, purplish, crowded, about 8 mm. long. *Lower glume* 8 mm. long, 2–2.5 mm. wide, elliptic or elliptic lanceolate in shape when flattened, acute, 3-nerved, rounded on the back below, compressed and keeled above, glabrous, minutely scabrid all over the dorsal surface, scabrid on the keel ; *upper glume* 7.5 mm. long, 1.75–2 mm. wide, narrowly elliptic-acute when flattened, 3-nerved, minutely scabrid all over the dorsal surface, rounded on the back below, keeled and compressed above ; rhachilla disarticulating above the glumes. *Lemma* seated on a short oblique callus which is glabrous, curved round the palea, 8.5 mm. long (including the bristles 3–4 mm. long) 1 mm. wide, oblong when flattened, 5–7-nerved, the two lateral nerves anastomosing at the top and carried out as two scabrid bristles 3–4 mm. long, covered all over the back with colourless hairs up to 2 mm. long ; awn from the sinus 14–15 mm. long, scabrid, not twisted at the base ; *palea* clasping the stamens, narrowly elliptic-acute, 6.5–7 mm. long, 2-nerved, covered on the dorsal surface with numerous long colourless hairs ; *stamens* 3 ; *anthers* 4–4.5 mm. long, each cell produced into a minute naked horn ; *styles* 2, very short ; *stigmas* plumose ; *lodicules* 3, oblong-acute, 1.5 mm. long.

INDIA: Kashmir, Kugzil, Rupshu, 4300 m., 16 Jul. 1931, *Koelz* 2328. TIBET. Probably in the vicinity of Lhasa. July–Sept. 1891, *Thorold* 124 ; East Tibet 16000 ft., 20 Jul. 1905, *Younghusband* 113 ; Tinkye Plain, Mt. Everest Expedition, 16 July 1933, *E. O. Shebbeare* 104.

The wider question whether the so-called *Stipa hookeri* Stapf actually is a *Stipa* or not is one which must be deferred to a later date. At any rate the section *Lasiagrostis* of *Stipa* in which *Stipa hookeri* Stapf was placed by Hook. f. is considered by Nevski (Act. Inst. Bot. Acad. Sci. 4, 224 : 1937) to be so different from *Stipa* proper that he has removed it from that genus and placed some of the species in the genus *Achnatherum* P. Beauv. (*Lasiagrostis* Link). This genus, while its relationship with *Stipa* is obvious, he believes to be more primitive on account of the simple awn and unindurated lemma. The structure of the spikelet of *Stipa Hookeri* seems to be different from that of both *Stipa* and *Achnatherum* and it is probable that further research will indicate that its relationships lie elsewhere.

LENTINUS IN TRINIDAD B.W.I.

R. W. G. DENNIS.

Species of *Lentinus* are very widespread in the tropics where, because of their tough consistency, they were among the few agarics collected in the last century and named by the early European mycologists. Consequently a great many species have been described from inadequate material and mycologists working in the tropics find great difficulty in assigning names to their familiar species. The present note aims at clarifying the conception of some of the common West Indian species but it will be understood that only a mycologist resident in the country can form a critical opinion on specific limits in these somewhat variable fungi.

The *Lentini* of Trinidad may be divided conveniently into two groups, those with a hairy pileus and those with a smooth pileus. The former belong to two fairly well-defined series: (a) With adpressed rope-like hairs on the pileus, including *L. crinitus* and a number of allied species, varieties or growth forms. (b) With short erect hairs forming a close velvety pile on pileus and stipe alike, including *L. velutinus*, *L. strigosus* and their allies. The members of this series are all mauve when young whereas those of series (a) seem to be always white or brown from the first.

The members of this hairy group have curious thick-walled cystidia protruding from their gills, arising directly from tramal elements which have pierced the hymenium.

On the above basis the Trinidad species known at present may be keyed out as follows:—

I Pileus more or less hairy.

- A. Pileus surface formed of radiating hyphae whose ends become free and cohere in long, loose, rope-like strands. Gills slightly anastomosing at the base and papillate with minute hyphal pegs.

- a. Pileus sparsely hairy except towards the margin, hairs rope-like, not cohering in squamules:

Pileus about 2 inches across, stipe smooth or with a fine brown felted surface *L. crinitus*

Pileus up to 1 inch, less deeply infundibuliform

L. bertierii

- b. Pileus densely hairy throughout, hairs more erect, often of single hyphae tending to cohere in pointed squamules, Stipe similarly hairy *L. nicotianus*

- B. Pileus covered with a pile of short erect hairs formed of single hyphae, gills not anastomosing at the base, whole sporophore at first mauve, soon turning brown.

- a. Stipe short and usually excentric *L. strigosus*

- b. Stipe long and central:

1. Gills broad, stipe long and stout, typically attached to buried wood *L. velutinus*

2. Gills narrow, stipe more slender, often tufted, on logs.
L. velutinus var. *leprieurii*

II Pileus smooth, white or cream coloured.

- A. Gills conspicuously dotted with protruding hyphal pegs

L. nigro-osseus

B. Gills without hyphal pegs or cystidia

a. Without a universal veil

1. Small species with more or less hemispherical pileus, becoming umbilicate with age *L. detonsus*
2. Large species with lobed pileus and excentric or lateral stipe *L. calvescens*

b. With a universal veil, retained as a specialised cuticle on the pileus, long-stalked and caespitose *Lentodiellum concavum***Lentinus Fr.**

Syst. Orb. Veg. 77 (1825).

Type species *Agaricus crinitus* L. ex Fr.1. *Lentinus crinitus* (L. ex Fr.) Fr., Syst. Orb. Veg., 77 (1825).*Agaricus crinitus* L. ex Fr., Syst. Myc. **1**, 175 (1821).*L. villosus* Klotzsch, Linnaea **8**, 479 (1833).*L. leveillei* Berk. in Trans. Linn. Soc. London **20**, 112 (1851).*L. schomburgkii* Berk. in Trans. Linn. Soc. London, **20**, 111 (1851).*L. wrightii* Berk. & Curt. in Journ. Linn. Soc. London, **10**, 300 (1869).*L. rigidulus* Berk. & Curt. in Journ. Linn. Soc. London, **10**, 301 (1869).*L. subcervinus* Berk. & Curt. in Journ. Linn. Soc. London, **10**, 301 (1869).

Pileus up to about two inches across, deeply infundibuliform, the margin curved downwards and at first inrolled, surface white, drying reddish-brown and shining, marked by parallel strands of darker radiating hyphae whose ends become free as long loose brown hairs, formed of numerous parallel, coherent hyphae. Flesh thin, tough, white. Gills deeply decurrent, narrow, crowded, interconnected at the base in a short network like that of *Paxillus involutus*, well figured by Berkeley (1851, t. 9), white, drying light brown, edge almost entire, surface dotted with short pegs composed of coherent, thick walled hyphae. Stipe central, usually about one inch long, 1/8 – 1/4 inch thick, surface rather downy-fibrillose, not scaly or velvety, equal, solid. Tramal hyphae about 4 μ wide with thick hyaline walls and fine lumen, lying both vertically and longitudinally in the gills, the pileus cuticle not differentiated from the trama. Spores not seen. On dead wood.

Specimens examined :

Trinidad : H. Caracciola 12.v.1910 ; River Estate, Diego Martin, 13.1.1921, *E. M. Wakefield* ; 24th–26th mile post on Long Stretch, 16.III.1928, *W. E. Broadway* 6798 ; St. Augustine 27.VII.1947, *R. E. D. Baker* 1529 ; Bacolet Valley 23.VIII.1947, *W. T. Dale* 1596.

British Guiana : Moraballi Creek, Essequibo River, 16.X.1929, *E. B. Martyn* 590.

French Guiana : Specimen from Leveillé in Herb. Berk. as *L. schomburgkii*.

Brazil : San Carlos del Rio Negro, April 1853, *Spruce* 128 : Minas Geraes, *C. Torrend*, Nov. 1913 ; unlocalised, Herb. Hook.

Ecuador : E. Andrée, Herb. Am. Æquinoct. 4597.

Peru : Peruvian Andes, *Pearce*, Herb. Cooke.

Costa Rica : Ørsted in Herb. Fries, Uppsala.

Nicaragua : Herb. Hook.

Mexico : ex Herb. Paris in Herb. Cooke.

Dominica : North end Windward forest, 23.VII.1888.

Martinique or Guadeloupe : Husnot, Pl. des Ant. Nos. 589 & 589b (1868).

Montserrat : on *Tecoma leucoxydon*, South 114.

San Domingo : Herb. Berk. No. 4 as *L. schomburgkii*.

Jamaica : Brown, History of Jamaica tab 15, fig. 1.

Cuba : Wright 179 (type of *L. wrightii*) ; 175 (type of *L. rigidulus*) ; 177 (type of *L. subcervinus*) ; 68 ; 69 ; 178 ; 181 ; Fungi cubenses wrightiani 143, 144, 146, 149, 150.

Florida : J. B. Ellis, Herb. Cooke, 3991 ; Ellis and Everhard, N. Am. Fung. Ser. II, 1600, winter of 1885 ; Hogtown Creek, Alabama Co., R. Singer, Reliquiæ Farlowianæ 982.

The following are a dark brown very densely hairy form with tightly inrolled margin which may possibly be distinguished as *L. fumigatus* Lév. 1846, but which in absence of field evidence I prefer to regard as a juvenile state :

French Guiana : authentic material of *L. fumigatus*.

Brazil : Panuré, Spruce 129, Herb. Berk. : Minas, Oct. 1840, Gardner, Herb. Hook. ; Rio Janeiro, Mr. Fry's garden, 6.VIII.1826, Herb. Berk. ex Burchell herbarium ; Bahia, Challenger, Herb. Berk. ; unlocalised specimen in Herb. Berk. ex Herb. Hook. labelled *L. berterii*, later corrected to *L. villosus*.

Cuba : Herb. Hook. ; C. Wright 71, Herb. Berk. as *L. stuppeus* Kl.

Cayman Is. : East end Cayman I., on mahogany 15.XII. 1945, C. B. Lewis 7.



Fig. 1. *Lentinus crinitus*, left ; juvenile specimen from Cayman Is. ; right ; sketch of the Linnaean specimen, Linn. 1279.1.

L. crinitus varies greatly in number and density of hairs and there has been a tendency to call the smoother forms *L. crinitus* and the hairier *L. villosus*. There is a complete intergrading series and the two cannot be separated in herbarium material. *L. villosus* was described from Mauritius and the type at Kew is not remarkably hairy. If a name is required for the very shaggy forms from tropical America it will be better to revive *L. fumigatus* Lév. *L. stuppeus* Klotzsch is a dark, almost black, form with shaggy pileus and stipe bristly, at least at the base, which is not matched among the American material at Kew. It was described from Mauritius and collections comparable with the type have been received from tropical Africa.

L. nigripes Fr. is another probable synonym of *L. crinitus*, as shown by Fries specimen under that name at Uppsala. The name was, however, published by Klotzsch who cited as type a specimen from "Ins. Maurit. Telfair, Hb. Hook.". There appears to have been some confusion as the only relevant specimen from Telfair in Herb. Hooker has been labelled by Klotzsch himself *L. villosus*, a species published on the same page as *L. nigripes*. *Agaricus essequiboensis* Meyer ex Fr. 1821, may be *L. crinitus* but I have been unable to ascertain if the type still exists at Gottingen.

2. *Lentinus bertierii* (Fr.) Fr., Syst. Orb. Veg. 77 (1825).

Agaricus crinitus Bertier apud Sprengel in Kongl. Vet. Acad. Handlingar, 50 (1820).

Agaricus bertierii Fr. Syst. Myc. 1, 175 (1821).

L. crinitus (L. ex Fr.) Fr. var. *bertierii* Pilat in Ann. Mycol. 34, 110 (1936).

Pileus up to one inch across, deeply umbilicate, light yellowish, becoming yellowish brown with age, the surface smooth and dotted with small blackish-brown pointed squamules, more or less adpressed but free at the tips. Flesh thin, white, tough. Gills crowded, narrow, decurrent, anastomosed at the base, cream coloured, edge denticulate, surface dotted with minute papillae scarcely visible under a hand lens, formed of several parallel, coherent, thick-walled hyphae. Stipe short, 1/8–1/4 inch thick, solid, covered with brown or blackish scurfy down. Tramal hyphae thick-walled, hyaline 4–5 μ wide, cuticle of pileus about 15 μ thick, formed of compact thinner-walled hyphae. Spore print pure white, spores hyaline, non-amyloid, cylindrical, 5–7 $\times$ 1.5 μ . Basidia cylindric-clavate, 18 $\times$ 3 μ , 4 spored. In clusters on dead wood. Specimens seen :—

Guadeloupe : Type, Sprengel in Herb. Fries, Uppsala.

Trinidad : on dead *Cocos* trunk, Cocal, 22.XI.1949, Dennis 352.

Nicaragua : C. Wright, Herb. U.S. North Pacific Exploring Expedition.

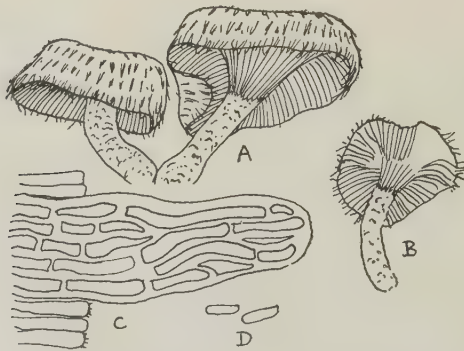


Fig. 2. *Lentinus bertierii* (a) Dennis 352 from fresh material.
 (b) sketch of the type in Herb. Fries, Uppsala.
 (c) Section of hymenial peg $\times$ 650.
 (d) Spores $\times$ 650.

Cuba : Fungi cubenses wrightiani 145.

Jamaica : Corn Puss Gap, St. Thomas, Amy Barry F 69, 25.IV.1946.

Dominica : Clark Hall, 15.XI.1920, E. M. Wakefield.

The Dominica collection exactly matches the type, the others are a little larger but are, I think, referable to the same species. The Nicaraguan and Cuban collections cited were determined by Berkeley as *L. tener* Klotzsch apud Fries 1836 but the type of that species, stated to be ex Herb. Hooker, is not represented at Kew and its interpretation remains uncertain. Another similar form is *L. swartzii* Berk. of which the type, from Jamaica, can no longer be traced at South Kensington. *L. ravenelii* Berk. & Curt. is superficially somewhat similar but has a softer texture and lacks the hymenial glands. The Trinidad form with dark squamules resembles *L. tigrinus* (Bull. ex Fr.) Fr. but has small spores. This may be what Pilat (1936) regards as the tropical form of that plant, under the name *L. tigrinus* var. *holopogonius* (Berk.) Pilat but it is not *L. holopogonius* Berk.

Teixeira (1946) has well figured *L. bertierii* from Sao Paulo, Brazil, under the name *L. crinitus*.

3. *Lentinus nicotianus* Berk. Hooker's Kew Journ. Bot. **8**, 141 (1856).

Pileus one to two inches across, hemispherical, then more or less flattened with a small umbilicus, surface covered with dark brown, more or less erect, thick walled hairs, tending to run together into rope-like strands which cohere at their tips to form pointed squamules. Flesh white, tough. Gills crowded decurrent, not anastomosed at the base but gradually dying out amongst the hairs of the stipe, edge denticulate, surface white or pale lilaceous, dotted with short, glandular hyphal pegs which are often capped by an irregular mass of crystals. Stipe central, about 1/8-1/4 inch thick, solid, clothed with short brown, downy hairs. Tramal hyphae about 4 μ diameter with thick hyaline walls, undulating but lying more or less parallel and vertical in the gills. There is no cuticle to the pileus and the squamule hairs arise directly by outgrowth of the tramal hyphae. Spores cylindrical, hyaline, non-amyloid, 7-8 $\times$ 2-2.5 μ .

The pileus surface dries dark grey-brown and in the type the squamules assumed a yellowish-brown tint like that of pipe tobacco, hence the specific epithet. Gregarious on dead wood.

Specimens examined :

Brazil : Panur , January, Spruce 45 (Type).

British Guiana : April 1887, Jenman 3792.

Trinidad : H. Caracciola No. 17, May 1910 ; St. Augustine, 28.V.1947, R. E. D. Baker 1441.

Teixeira (1946) has well figured this species under the name *L. villosus*.

4. *Lentinus velutinus* Fr. Linnaea **5**, 510 (1830).

Lentinus blepharodes Berk. & Curt. Journ. Linn. Soc. London **10**, 301 (1869).

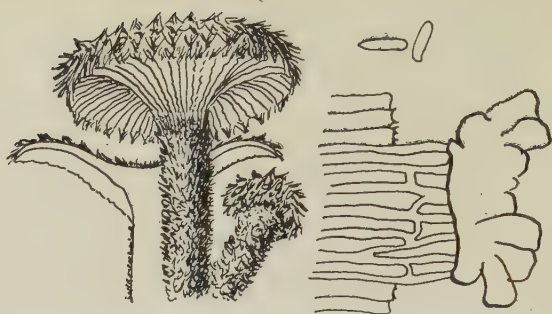


Fig. 3. *Lentinus nicotianus* from fresh material, of Baker 1441. Hymenial peg and spores $\times 650$.

Pileus deeply infundibuliform, becoming flattened with a central umbilicus, up to four inches across, surface densely clothed with short erect, cinnamon-brown hairs, which sometimes cohere slightly to form loose conical tufts, closely striate where the pile is eroded, margin shortly ciliate. Flesh thin, tough. Gills rather crowded, deeply decurrent, not anastomosed at the base but disappearing under the pile on the stipe, edge even, concolorous with the pileus, devoid of glands or hyphal pegs. Stipe central, long, cylindrical, about $\frac{1}{4}$ inch thick, solid, completely clothed with short, erect hairs like those of the pileus. Spores not seen, but Teixeira found them to be $6-7 \times 2.5-3\mu$. On roots of trees and buried wood in forests.

Specimens examined :

Brazil : Type in Herb. Fries, Uppsala ; unlocalised from Gardner, Herb. Berk. ; Teixeira has figured the species from Sao Paulo.

Paraguay : Guarapi 1880, Balansa Pl. du Paraguay 3367.

British Guiana : Demerara 1884, Herb. Cooke.

Central America : Herb. Hooker.

Costa Rica : Los Concavas, 4700 ft. Dec. 1925, & 1929, C. H. Lankester.

Cuba : Wright 66, 157, Herb. Berk. ; Wright 169 n Herb. Berk. as *L. nepalensis* Berk. ; Wright 72, 75, 170, 171 as *L. blepharodes* Berk. & Curt.

The name *L. blepharodes* Berk. & Curt. applies to forms in which the pileus is broad and flattened with a less dense coating of hairs. These are here regarded as an expanded state of *L. velutinus* with which they otherwise agree, but this conception should be checked by observation of the living plants. A Trinidad collection of the typical form is not yet to hand but the following variety may prove to be no more than a growth form occurring on logs above ground.

var. *leprieurii* (Mont.) comb. nov. *Lentinus leprieurii* Mont. in Ann. Sci. Nat. Ser. 4, 1, 119 (1854).

Differs from the type in its smaller size and narrower obtuse gills. The fungus is at first bright mauve throughout, soon turning cinnamon brown, the flesh white. Trametal hyphae are about 3μ diameter with thick hyaline walls and run both vertically and longitudinally in the gills.

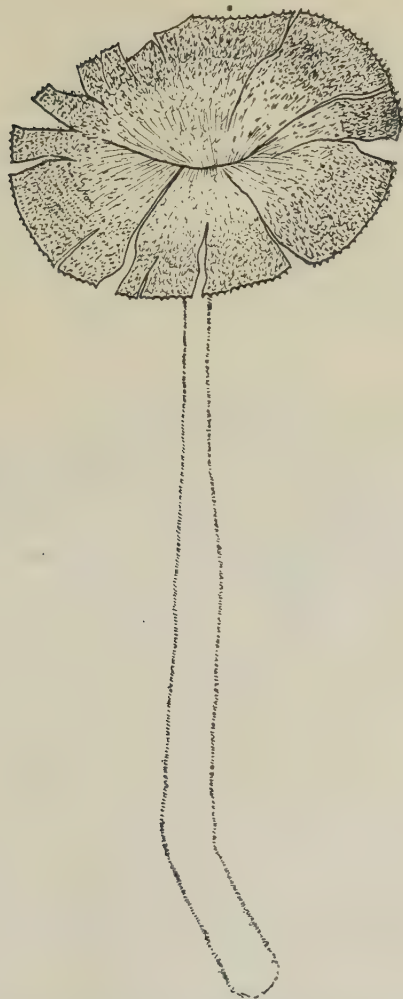


Fig. 4. *Lentinus velutinus* sketch of the type specimen in Herb. Fries, Uppsala.

Those of the pileus surface are more compact but there is no distinct cuticle. The hairs are formed of single, brown, thickwalled hyphae, about 5μ diameter. There are no hyphal pegs or glands on the gills but a few tramal hyphae turn outwards and penetrate the hymenium as short, colourless, more or less pointed cystidia. No spores were found though freshly collected mauve and brown sporophores of Dennis 182 were left overnight under conditions in which *L. bertierii* and *Marasmius* spp. spored freely.

On dead wood, arising from white mycelium below the bark.

Trinidad : In swarms on Mora logs and chips, Valencia forest, 16.X. 1949, *Dennis* 182.

British Guiana : *Jenman* 3791, April 1887.

French Guiana : ad ligna combusta in carbonariis Guyana, authentic material from Montagne in Herb. Berk. ; Cayenne, Herb. Berk.

Brazil : *Sallé* 129, Herb. Berk. ; Manaos, Amazonas, 1900, Ule, Myc. Bras. 49 b.

Peru : Leticia 1902, Ule, Myc. Bras. 49a.

Jamaica : Purdie, Herb. Hook. as *L. fulvus* Berk.

Cuba : *Wright* 183 ; *Wright* 182, the type of *L. siparius* Berk. & Curt. may probably also be this fungus.

Florida : Gainesville, Florida, Ravenel, Fungi Amer. Exs. 104.

It may be this that Teixeira (1946) described under the name *L. similis* Berk.



Fig. 5. *Lentinus velutinus* var. *leprieurii*, from fresh material of Dennis 182. Section of hymenium showing cystidia and hair from pileus $\times 650$.

5. *Lentinus strigosus* (Schwein.) Fr. Syst. Orb. Veg., 77 (1825).

Agaricus (*Pleuropus*) *strigosus* Schwein. Syn. Fung. Carol. Sup., 63 (1822).

Pileus up to two inches across, irregular, more or less deeply umbilicate, at first violaceous, drying pale buff, surface finely tomentose with more or less erect, short, fine, tufted hairs. Gills crowded, deeply decurrent, concolorous, minutely papillate under a lens owing to the presence of both cylindrical, more or less pointed, thick-walled cystidia about $30 \times 3.7 \mu$ and short hyphal pegs almost $30 \times 15 \mu$, formed of parallel, thick-walled hyphae. Stipe short, excentric, 1/8–1/4 inch thick, solid, concolorous with the pileus and clothed with similar downy hairs. Trama of hyaline, thickwalled hyphae 4μ diameter, mostly lying longitudinally in the gills, intermixed with a few thinwalled hyphae ; cuticular layer of compact hyphae somewhat disorganised in dried material. Hairs up to $200 \times 5\text{--}7 \mu$ with thick, hyaline walls.

On trunks, posts and rotting wood.

Specimens examined :

Trinidad : 23rd–24th mile posts on Long Stretch, 18.V.1928, W. E. Broadway 6948.

French Guiana : material from Leprieur.

Brazil : Panuré, March 1853, *Spruce* 135 ; unlocalised, *Sallé* 263, Herb. Berk. ; Arrial des Mercés, Minas Geraes, Oct. 1840, *Gardner*.

San Domingo : *Sallé* 3, Herb. Berk.

Cuba : *C. Wright* 77, 78.

Florida : Sept.–Oct. 1888, Roumeguère *Fungi Sel. Exsic.* 4804.

Georgia : Darien, *Ravenel* 2511.

S. Carolina : Aiken, *Ravenel* 207 and *de Thumen*, Myc. Univ. 603.

N. Carolina : Authentic material from Schweinitz in Herb. Fries, Uppsala.

Ohio : Amanda, July 1883, *Rabenhorst–Winter* 2940.

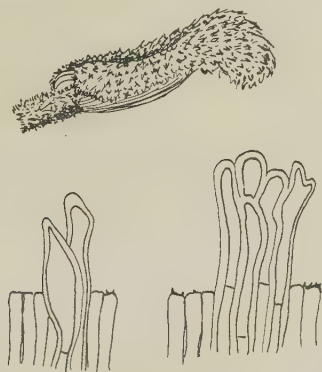


Fig. 6. *Lentinus strigosus* sketched from dried material, of Broadway 6948. Sections of hymenium with cystidia $\times 650$.

Also sporadically in south and central Europe according to Pilat (1935). Lloyd (1917 p. 7) attempted to distinguish the West Indian form from that found in the United States as being more fleshy and putrescent, and called it *L. guaraniticus* Speg. *L. lecomtii* Fr. 1828 is probably synonymous but the type is not now to be found at Uppsala. Pilat (1935) referred *L. strigosus* to *Pleurotus* under the name *P. rudis* (Fr.) Pilat but its affinities seem clearly with *L. velutinus* and the epithet *rudis* dates only from *Panus rudis* Fr. 1838. Fries (1836) has both *L. strigosus* Schwein. and *L. strigosus* Pers. The latter is, however, an error, presumably by the printer, for *L. strigopus* (Pers.) Fr., based on *Agaricus strigopus* Pers., described and figured in 1826 from Rawak I., off the north coast of New Guinea. Fries changed the name, apparently unnecessarily, to *L. capronatus* Fr. in 1838. Burmese specimens under this name in Herb. Currey closely resemble Persoon's figure of *L. strigopus* and are evidently allied to *L. velutinus*. *Lentinus strigellus* Berk. 1869 = *L. sparsibarbis* Berk. & Curt. 1869 = *Pleurotus (Lentinopanus) strigellus* (Berk.) Pilat 1936 is perhaps no more than a variety of *L. strigosus*, distinguished by its smooth umbilicate pileus with rather distant concentric zones of small tufted downy hairs, more plentiful towards the finely ciliate margin. There are collections of this species at Kew from Cuba, Peru and Mexico. In a specimen from Costa Rica, so named by Bresadola, Pilat found spores $4.5-5 \times 2\mu$.

6. *Lentinus detonsus* Fr. in Acta R. Soc. Sci. Upsal. Ser. 3, **1**, 38 (1851).
Lentinus cubensis Berk. & Curt. in J. Linn. Soc. London **10**, 302 (1869).
Lentinus proximus Berk. & Curt. in J. Linn. Soc. London **10**, 302 (1869).
Lentinula cubensis (Berk. & Curt.) Earle in Bull. N.Y. Bot. Gard. **5**, 417 (1909).

Lentinula detonsa (Fr.) Murrill in Mycologia **3**, 28 (1911).

Pileus convex or slightly depressed at the disc, white, turning reddish brown in streaks and patches with age and decay, drying cream coloured or buff, one or two inches across, smooth, edge incurved. Flesh thick, white. Gills rather broad and crowded, almost free, white, turning dark reddish brown with age. Stipe at first central, becoming excentric or occasionally lateral, short, curved, white, fibrillose or subsquamulose, about 1/8 inch thick, solid. Trama of fairly thinwalled hyphae about 8–10 μ diameter, with clamp connections, lying parallel and vertical in the gills, loosely woven with large air spaces in the flesh of the pileus. Cuticle well developed, about 15 μ thick, of thin-walled closely woven hyphae 4–5 μ diameter. Cystidia absent. Spores elliptic-cylindric, hyaline, non-amyloid, 5–6 $\times$ 2–2.5 μ .

In swarms on dead wood, often erumpent through the bark.

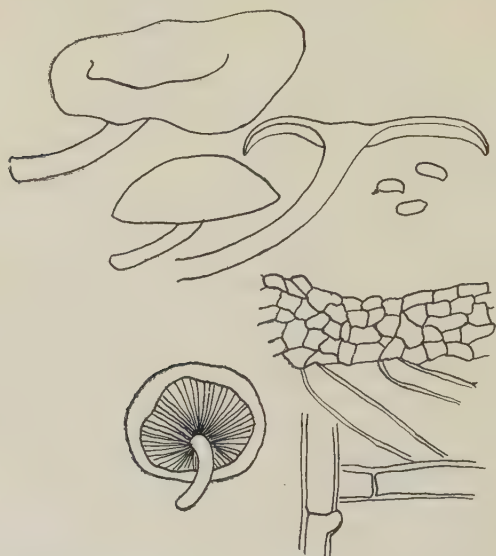


Fig. 7. *Lentinus detonsus*. Above : Dennis 329 from fresh material. Below : dried specimen showing the incurved margin natural size and section of pileus cuticle $\times$ 650.

Specimens examined :

Trinidad : Morne Bleu 27.1.1921, *E. M. Wakefield* 337 ; Caura Valley 11.XI.1949, *Dennis* 329 ; Maracas Waterfall 25.X.1949, *Dennis* 329A.

Cuba : *Wright* 115 (type of *L. cubensis*), 80 ; 112 ; *Fungi cubenses wrightiana* 161 ; *Wright* 27, 117 and *F. cub. Wr.* 162 as *L. proximus*.

Though I have not seen the type of *L. detonsus* Fr., which is not at Uppsala, the description agrees well with the above and I see no reason to dissent from the synonymy already proposed by Murrill and Pilat.

L. cubensis is the type species of *Lentinula* Earle, but Singer (1942) considers that in essential characters it cannot be separated from *Lentinus*.

7. *Lentinus calvescens* Berk. in Hooker's Journ. Bot. **8**, 141 (1856).

Pleurotus jacksoni Berk. & Cooke in J. Linn. Soc. Bot. **15**, 367 (1877).

Pileus very large, irregularly lobed, up to six inches across, flat, somewhat depressed at the centre and arched at the margin, smooth, white, drying buff and then finely striated. Flesh rather thick, white, soft. Gills broad, distant, thin, decurrent, margin entire, surface smooth, cream coloured. Stipe short, central, becoming excentric, equal or slightly enlarged at the base, up to 1/2 inch thick, smooth, solid, white. Tramal hyphae 5–6 μ diameter, with thick hyaline walls and a narrow lumen, running vertically and longitudinally in the gills, cuticle thin, compact, of closely woven, thin-walled hyphae, somewhat disorganised in dried material. Cystidia absent. Spore print cream coloured, spores hyaline, non-amyloid, cylindrical or slightly curved, 6–8 $\times$ 1.5–2.25 μ .

More or less caespitose on dead wood.

Specimens examined :

Trinidad : 22nd–24th mile post on Long Stretch, 18.V.1928, *W. E. Broadway* 6847 ; Botanic Gardens, Port of Spain 1894, 5890 ; St. Augustine 20.VIII.1947, *R. E. D. Baker* 1545.

British Guiana : Essequibo opposite Bartica, Nov. 1886, *Jenman* 2468.

Brazil : Panuré Feb. 1853, *Spruce* 136 (Type) ; Mauhes, Trail 125 (type of *P. jacksoni*).

Barbados : *F. Watts*, Nov. 1910 ; on *Tecoma leucoxylon*, Farley Hall, 26.IX.1920, *E. M. Wakefield* 8.

Dominica : North end Windward forest 31.VIII.1888.

Jamaica : *R. E. Osborne*, June 1948.

It is noteworthy that apart from the Brazilian material named by Berkeley all the above collections are from British colonies. It seems likely that at other herbaria this conspicuous and common species passes under other names. Murrill (1916) cited thirteen synonyms, the oldest being *Agaricus hirtus* Fr. 1830 but in some points his synonymy is demonstrably wrong and for the present I adhere to the well authenticated name *L. calvescens* Berk.

8. *Lentinus nigro-osseus* Pilat in Ann. mycol. **34**, 122 (1936).

Pileus about one and a half inches diameter, convex with a shallow central umbilicus, surface smooth, white or cream coloured, sometimes with brownish striae at the centre, margins undulating, closely striate. Flesh thin, white, tough and fibrous. Gills crowded, narrow, white, decurrent, their edges finely denticulate, bearing on their faces numerous white hyphal pegs up to 125 $\times$ 27 μ readily visible under a hand lens. Stipe central, slender, equal, undulating, smooth, yellowish brown, darker at the base, about 1/8 inch thick, solid. Trama homogeneous, of interwoven hyphae 4–5 μ diameter with colourless walls 1–1.5 μ thick. The hyphae of the hymenial pegs are rather thinwalled and their contents stain deeply in cotton blue. Cuticle of the pileus of parallel hyphae 4 μ wide. Spore print white, spores cylindrical, 4–5 $\times$ 1.5 μ .

On logs.

Specimens seen :

Trinidad : c. 2000' on Mt. Aripo, 23.X.1949, *Dennis* 217.



Fig. 8. *Lentinus nigro-osseus* from fresh material of *Dennis* 217. Below : Hymenial peg and spores $\times 650$.

One feels there should be an older name for this well defined species. A collection from Point de Galle, Ceylon, named *Lentinus pergamenus* Lev. by Berkeley agrees tolerably but an authentic sporophore of that species labelled by L  veill   "L. pergamenus L  v. Java ? herb. de Candolle", though macroscopically similar, lacks the hyphal pegs on the gills. Moreover that species was densely caespitose, which is not true of 217. *L. subnudus* Berk. seems to be a similar but stouter form. *L. subglaber* Lloyd from Brazil was described as having "short projecting hyaline hyphae" on the gills but the young pileus was rose coloured and the spores $5 \times 3.5\mu$. *L. leucochrous* L  v. and *L. cladopus* L  v. are much like *L. pergamenus* but seem to differ from 217 in that the former has a bulbous stipe and the latter a branched stipe.

Pilat saw only dried material from Guadeloupe, which he described as "nigro-brunneo" and in referring the Trinidad collection to his species I am influenced especially by the abundant glandular hyphal pegs on the gills. He described them as "organa cystidiformia $60 \times 20-30\mu$ ex hyphis conglutinatis, quae glandulas stipitatas Phaneorgamorum nonnullarum in mentem revocant."

Lentodiellum *Murrill* in *Mycologia* **7**, 216 (1915).

9. *Lentodiellum concavum* (Berk.) *Murrill* in *Mycologia* **7**, 216 (1915).

Panus concavus Berk. in *Ann. Mag. Nat. Hist. Ser. 2*, **9**, 194 (1852).

Pileus one to two inches across, infundibuliform, smooth, white, margin incurved. Flesh thin, firm, white. Gills crowded, narrow, thin of several lengths, deeply decurrent, white, drying yellowish. Stipe long, equal, about 1/8 inch thick, solid, smooth, white, longitudinally furrowed

when dried. Trama of thin-walled hyphae $4-5\mu$ diameter. Cuticle of the pileus $20-25\mu$ thick, of very slender hyphae with thick gelatinised walls. Basidia cylindrical, 3μ wide, four spored. Spore print white, spores cylindric-elliptic, non-amyloid, $5-7 \times 2-2.5\mu$. There are no cystidia on the gill face but the gill edge is fringed with slightly clavate thinwalled hairs about $20 \times 4-5\mu$. Densely caespitose on decaying wood.

Specimens seen :

San Domingo : Herb. Berk. (Type).

Trinidad : on buried wood in a manure heap, St. Augustine, 9.II. 1950, *J. Wilson*.

Murrill founded the genus *Lentodiellum* on this species, which he regarded as akin to *Lentinus* but differing in possessing a veil. Structurally it differs also in its thinwalled hyphae and its affinities may be rather with *Clitocybe*.

I have to thank Professor Nannfeldt for lending the tropical American material of *Lentinus* in E. M. Fries' herbarium, including the types of *L. bertierii* and *L. velutinus*, and Miss E. M. Wakefield for kindly allowing me to use her own West Indian collections and for reading the manuscript.

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THE BOTANY OF BEECHEY'S VOYAGE.

In the Journal of Botany 31 : p. 298, B. Daydon Jackson assigns dates of publication to the various parts of Hooker and Arnott's "The Botany of Beechey's Voyage" with the exception of Part 6, pp. 241-268. This he did by reference to Pfeiffer's Nomenclator for the dates of the new genera, assuming that the dates given therein must have been gathered from some copy.

Regarding Part 6 Jackson stated that there was "no indication of date owing to the absence of any new genus". Part 6 was, however, noticed in the Ann. Nat. Hist. vol. 1, p. 476 (Aug. 1838) where it is stated that the sixth part had been recently published. From this it appears that Part 6 appeared in 1838 before August.

H. S. MARSHALL.

Plant Diseases*:—This curious compilation is divided into 5 very unequal chapters, viz. an introduction, a list of garden chemicals used in U.S.A. and their methods of application, a classification of plant pathogenes, a list of plant diseases under headings from Anthracnose to Wilt and a list of Host plants with names of the diseases recorded on them. The classification of pathogenes is merely copied from standard manuals, the list of host plants and diseases is based on that already issued by Weiss in the Plant Disease Reporter. What then is the purpose of this new and very expensive volume? The primary problem in plant pathology is correct diagnosis but it is idle to suppose that a gardener will correctly diagnose a plant disease by running down the list under the host in chapter 5 and checking back to the kind of disease in chapter 4. Indeed, on p. 406 the author admits as much and recommends seeking professional advice before acting on a diagnosis obtained from the book. (But why not seek the advice in the first place?) Whatever may be the circumstances favourable to the handbook in the United States it can certainly serve no useful purpose elsewhere.

Detailed criticism of the text is hardly called for but it may be well to remind the author that the latest new combination of a fungus name is not necessarily the best. Thus, *Pycnostysanus azaleae* (Peck) Mason March 1941 is to be preferred to *Briosia azaleae* (Peck) Dearness August 1941. But there is no real advantage in abandoning here the familiar name *Sporocybe azaleae* (Peck) Sacc. 1886. In popular books addressed to gardeners a considerable degree of conservatism and stability in nomenclature is desirable. For example it is unwise to accept uncritically all Whetzel's segregates from *Sclerotinia* unless and until they have become established mycological usage. But if there is to be this feverish pursuit of nomenclatorial novelties why ignore all those proposed outside the United States and retain, for example, *Pezizella oenotherae* (Cooke and Ellis) Sacc. 1889 against *Discohainesia oenotherae* (Cook & Ellis) Nannfeldt 1932? Adoption of the binomial system of nomenclature for viruses merely indicates a complete lack of appreciation of the virus problem. What, for example, is one to understand by *Marmor marginans* strawberry yellow edge virus? Prentice (1948, 1949) has shown that yellow edge in Royal Sovereign may be produced by a combination of his viruses 1 and 2 or 2 and 3. To which of these three entities does the name *Marmor marginans* apply? Actually it means nothing at all but a diseased strawberry and the adoption of binomial names for symptom expressions is mere scientific charlatanism.

The book is illustrated with photographs of symptoms, which are usually good, and line drawings of pathogenes which set a new low standard even for pseudoscientific manuals. The worst published figures of an organism we have ever seen are the nematodes in fig. 59, in which one cannot tell head from tail. There is never any indication of the degree of magnification, even where these nematodes, actually shown $\times$ about 50 appear side by side with sketches of diseased leaves natural size.

R. W. G. DENNIS.

*Plant Disease Handbook. Cynthia Westcott. Van Nostrand Co. Inc., New York, and Macmillan and Co. Limited., London, 1950, vii + 746 pp. \$7.50 or £2 16.

TROPICAL AFRICAN PLANTS : XXI*

TURNERACEAE

Hyalocalyx setifer Rolfe in Journ. Linn. Soc. Bot. **21**, 258, t. VII (1884)—as *H. setiferus* ; Vatke in Abhandl. Naturw. Ver. Bremen **9**, 116 (1887) ; Gilg in Engl. & Prantl, Pflanzenfam., ed. 1, III, **6A**, 62 (1893)—as *H. setifer*, et ibid., ed. 2, **21**, 464 (1925) ; Perrier de la Bâthie in Arch. Bot., Bull. Mens. **4**, 7 (1930) ; Mildbraed in Notizbl. Bot. Gart. Berl. **13**, 282 (1936)—as *H. setiferus*.

Turnera setifera (Rolfe) Baill. in Bull. Soc. Linn. Paris **1**, 582 (1886).

Hyalocalyx Dalleizetti Capitaine in Bull. Herb. Boiss., sér. 2, **8**, 252, t. V (1908).

TANGANYIKA. Lindi District. In the neighbourhood of Lukuledi about 150 Km. west of Lindi, small isolated groups at the edges of fields and paths, 20 April 1935, *Schlieben* 6338 (in Brit. Mus. Herb.).

PORTUGUESE EAST AFRICA. Quelimane District. Lugela, Moebede Road ; common along parts of the roadside (close to granite outcrops), 6 April 1948, *Faulkner* K 234 :—flowers dark yellow.

Hyalocalyx setifer was described from material collected by Dr. Christian Rutenberg on the " small island of Nossi-bé " (or Nosy-Bé) off the north-west coast of Madagascar. The type specimen is, or was, in the possession of the Herbarium at Bremen, but a small portion, together with dissections, was retained by Rolfe, and is preserved in the Kew Herbarium. Vatke (1887) cites additional material (*Hildebrandt* 4124) from Imerina, on the eastern side of Madagascar, and Perrier de la Bâthie (1930) states that the plant is widespread all over the western regions of the island, but hitherto there would not appear to have been any records for it outside the Mascarene area. It was, on this account, a pleasant surprise to find excellent specimens of *Hyalocalyx setifer* amongst a collections of plants from Portuguese East Africa recently presented to Kew by Mrs. H. G. Faulkner. The habitat at first suggested that the plant might not be native in this area, but subsequent information received from the collector, and from M. Perrier de la Bâthie, leads to a very different conclusion. Mrs. Faulkner finds no reason to suspect the standing of the plant in Mozambique ; the specimens were found at the side of a forest road, in company with other small annuals, and at a long distance from any cultivation or huts. M. Perrier de la Bâthie, so far from suspecting the indigenoussness of the African specimens, is of the opinion that the plant is a native of the African mainland, and an introduced weed in Madagascar, remarking (in litt.) : " Cette plante, largement répandue sur le versant occidental de l'île, n'a pas à Madagascar le comportement d'une espèce spontanée. Elle y est souvent messicale, et probablement introduite. Sa découverte à Mozambique confirme mes soupçons à ce sujet ".

A second species of *Hyalocalyx*, *H. Dalleizetti* Capitaine, is, according to Perrier de la Bâthie, indistinguishable from *H. setifer* Rolfe. With this conclusion we are in complete agreement ; the characters employed by Capitaine to distinguish his species are scarcely more than additions and amendments to those given by Rolfe for *H. setifer*. *H. Dalleizetti* is not mentioned by Gilg in Engler & Prantl's Pflanzenfamilien ed. 2, nor by Lemée in his Dictionnaire.

*Continued from Kew Bull., 1948, 473.

Since the above account was written additional evidence has come to light concerning the distribution of *Hyalocalyx setifer*. In 1935 H. J. Schlieben collected it near Lukuledi in S.E. Tanganyika. The Tanganyika plants were growing in very much the same sort of habitat as those found by Mrs. Faulkner. But this extension of its known geographical range lends greater weight to the opinion that the species is a true native of the African mainland and it seems not improbable that it will be discovered in other places in the East African coastal region.

R. B. DRUMMOND & R. D. MEIKLE.

VIOLACEAE

Rinorea (Subgen. *Tubulosae*, Sect. *Violanthus*, §*Illicifoliae*) **keayii** Brenan, sp. nov. ; ut videtur *R. afzelii* Engl., mihi e descr. tantum cognita, proxima, foliis latioribus, pedicellis longioribus, sepalis petalisque multo majoribus, appendicula antherarum haud emarginata differt. *R. prasina* Stapf ex M. Brandt et *R. crassifolia* (Bak. f.) De Wild. differunt praeterea antheris sessilibus.

Arbor parva, circiter 7–8 m. alta. *Ramuli* glabri, virides, siccitate lineis elevatis striolati ; internodia superiora 0·5–1 cm. longa, inferiora multo longiora, usque ad 5 cm. longa. *Foliorum* petiolus validus, 0·8–2·2 cm. longus, circiter 2 mm. crassus, glaber ; stipulae caducissimae, omnes delapsae ; lamina coriacea vel subcoriacea, elliptica vel late elliptica, apice acuminata vel subacuminata, basi foliorum majorum rotundata minorum late cuneata, marginibus praesertim dimidio superiore sinuato-serratis dentibus haud spinescentibus, 13–20 cm. longa, 6–11·5 cm. lata, glabra, viva obscure viridis et nitida siccitate pallide vel glaucescenti-viridis, nervis lateralibus primariis utroque costae latere 6–9 sursum arcuatis et prope marginem anastomosantibus ut venis arcte areolatis utrinque sed praesertim supra prominentibus. *Inflorescentiae* terminales, paniculatae, ovoideo-pyramidales, satis laxae, circiter 5–8 cm. longae et 3–5 cm. latae, sessiles vel subsessiles, sparse et minutissime puberuli ; ramuli inferiores satis validi, usque ad 5 cm. longi, recti, erecto-patentes ; cymulae ultimae 2–5-florae ; pedicelli articulati, (3–) 5–7 mm. longi, glabri vel fere glabri, bracteolis minimis ovato-triangularibus minute ciliolatis instructi. *Flores* fragrant, gilvi, inter affines magni, 7–8 mm. longi. *Sepala* crassa, rigida, suborbicularia vel latiora quam longa, 2·5–3 mm. longa, 2·5–3·5 mm. lata, apice rotundata, margine ciliolata, flabellatim plurinervata, nervis prominulis. *Petala* erecta, oblongo-elliptica, 5–6 mm. longa, 3 mm. lata, apice rotundata, glabra. *Staminum* filamenta breviter et lata sed distincta, 0·5 mm. longa, 0·75 mm. lata, basi in tubum brevissimum circiter 0·25 mm. altum connata ; connectivum apice in laminam siccitate brunneam ovato-triangularem 1·5 mm. longam 1·25 mm. latam productum ; thecae 1·6 mm. longae, 1 mm. latae, apice appendicula circiter 0·6 mm. diametro suborbiculari explanata sed marginibus basin versus valde inflexis superne paulum erosis. *Ovarium* glabrum, suborbiculare, 1·5 mm. diametro, apice stylo 3 mm. longo medio paulum incrassato. *Fructus* nondum visus.

NIGERIA. Ogoja Province, Obudu Division. Sonkwala area, R. Ata below Koloishe, in high forest of valley, c. 1220 m., 19 Dec. 1948, *Savory & Keay in For. Herb., Ibadan*, 25023 (Herb. Kew) :—small tree 8 m. high

with low spreading crown and cream flowers. Sonkwala area, in high forest on the Ikvette-Balegette path, S. escarpment of the grass plateau, 1370 m., 29 Dec. 1948, *Savory & Keay in For. Herb., Ibadan*, 25206 (typus in Herb. Kew) :—understorey tree c. 7 m. high with shiny dark green leaves and fragrant cream flowers.

The species of the §*Illicifoliae* fall into two groups, having or lacking spinose teeth on the margins of the leaves ; *R. keayii* lacks them, and thus is related to three species, *R. afzelii* Engl., *R. prasina* Stapf ex M. Brandt and *R. crassifolia* (Bak. f.) De Wild., but is distinguished from all by, *inter alia*, the considerably larger flowers on longer pedicels. *R. prasina* and *R. crassifolia* are in addition separated by their sessile anthers. *R. prasina* is a shrub not a tree, and the thecae bear at their apex a much smaller appendage. *R. crassifolia* has obscurely repand-serrulate leaf-margins (not, however, entire as described by Baker), a narrowly cylindrical inflorescence about 4 cm. long and 1 cm. wide, pedicels up to about 2 mm. long, and sepals only about 1 mm. wide (dried), and a narrow appendage to the anther-thecae. In all these points they are at variance with *R. keayii*.

The lower surface of the leaves of the new species is abundantly speckled with tiny brown dots. Their abundance and evenness at first suggested those glands that make such an useful character in some species of *Rinorea*. Miss E. M. Wakefield kindly cut some sections of the leaves which showed that the dots were neither glands nor an attack by a fungus, but apparently punctures made by some small creature.

The new species is named after one of its collectors, Mr. R. W. J. Keay, of the Nigerian Forest Service, who has done much to further the study of the vegetation and flora of Nigeria.

J. P. M. BRENNAN.

POLYGALACEAE

***Carpolobia suaveolens* Meikle**, sp. nov., *C. Goetzei* Gürke affinis, sed ramulis et costis pilosis floribusque minoribus facile distinguenda.

Frutex cortice albedo, ramulis juvenilibus primo pilosis postea glabrescentibus. *Folia* varia, nunc ovata vel obovata, nunc lanceolata vel elliptica, usque 11.0 cm. longa et 4.0 cm. lata, integra, papyracea, supra glabra nitida, venulis reticulatis instructa, infra nervis lateralibus 7–12 impressis, costis valde prominentibus apicem versus glabris basin versus pilis longis pallido-fulvidis dense obtectis, apice obtusa vel acuta, basi in petiolum brevem pilosum usque 4.0 mm. longum coartata. *Flores* albi, circiter 7–10, in racemum axillarem brevissimum usque 8.0 mm. longum conferti ; pedunculi et pedicelli dense fulvido-pilosi ; pedicelli usque 4.0 mm. longi. *Bractaeae* deltoideae, circiter 1.5 mm. longae 0.8 mm. latae, dense puberulae. *Sepala* 5, late ovato-lanceolata, subaequilonga, 4 circiter 6.0 mm. longa et 2.5 mm. lata, quintum circiter 5.0 mm. longum et 2.0 mm. latum, omnia apice obtusa et pilis brunneis oblecta. *Petala* 5, inaequalia, 2 superiora circiter 10.0 mm. longa et 4.0 mm. lata, undulato-crispata, 3 inferiora circiter 15.0 mm. longa et 5.0 mm. lata, omnia glabra et basi connata. *Stamina* 5, diadelphe, incurvata, glabra, dorso petalis adnata, filamentis complanatis usque 9.0 mm. longis, antheris rectangularibus circiter 1.0 mm. longis. *Ovarium* glabrum, fuscum, 3-loculare. *Stylus* glaber, arcuatus. *Stigma* globosum,

leviter 3-sulcatum. *Fructus* subglobosus, carnosus, 2–3-locularis, circiter 1.0 cm. diametro ; semina compressa, circiter 8.0 mm. longa et 6.0 mm. lata, pilis sericeis fulvidis dense velata.

PORTUGUESE EAST AFRICA. Quelimane District. Lugela, Namagoa estate, common along rivers, Nov.–Dec. 1946, *Faulkner* K 106 (type) :—a shrub with very numerous, white, lily-of-the-valley [*Convallaria*] scented flowers. “Makua country”, Namuli, *Last*, comm. 1887.

Allied to *C. Goetzei* Gürke, but with leaves of a thinner, papery texture, and the basal portion of the midrib densely and longly tawny-pilose. The flowers are somewhat smaller than those of other members of the genus, and crowded on short axillary racemes.

R. D. MEIKLE.

CARYOPHYLLACEAE

Spergula fallax (Lowe) E. H. L. Krause in Sturm, Fl. Deutschl., ed. 2, 5, 21 (1901).

Arenaria flaccida Roxb. Fl. Ind. 2, 447 (1832), non Clairv. (1811), *nom. illegit.*

Spergula pentandra L. var. *intermedia* Boiss. Diagn., ser. 2, 1, 93 (1853).

Spergularia fallax Lowe in Hook., Journ. Bot. & Kew Gard. Misc. 8, 289 (1856).

Spergula flaccida [Roxb.] Aschers. in Verh. Bot. Ver. Brand. 30, p. XLIII (1889), *nom. illegit.*

TROPICAL ALGERIA. Ahaggar Mts., Tamanrasset, 1500 m., 20 Febr. 1931, *Meinertzhagen* 100.

A.–E. SUDAN. About 21° N. latitude, near coast, 900–1200 m., 1896, *Bent* s.n.

This species, better known as *Spergula flaccida*, is widely spread in rather dry habitats from Madeira and the Canary Islands to India. The above are the only two specimens at Kew from tropical Africa. It is easily distinguished from other species of *Spergula* on account of its having only 3 styles and a 3-valved capsule. Its seeds have a wide wing closely resembling those of *S. pentandra* L. The epithet *flaccida* cannot be used, as *Arenaria flaccida* Roxb. in a later homonym. I am grateful to my friend, Mr. J. E. Dandy, for calling my attention to the occurrence of this plant in the Sudan and to the need for rejecting its more familiar name.

E. MILNE-REDHEAD.

LINACEAE

Hugonia faulknerae Meikle, sp. nov., *H. busseanae* Engl. affinis sed foliis et floribus majoribus, stylis 3 manifeste differt.

Frutex vel arbor parva ramosa, cortice albido spongioso sulcato, ramulis lentis iuventute dense fulvo-villosis. *Unci* ut videtur nulli. *Folia* magna, anguste obovata, ad summos ramulos plerumque conferta, usque 16 cm. longa et 5 cm. lata, apice obtusa vel acuta, raro acuminata, basi in petiolum sensim coartata, margine remote denticulata, lamina supra iuventute sparse pubescens, postea calvenscens, costa prominente pilis fulvis dense oblecta, nervis lateralibus 10–18 arcuatis adscendentibus, venulis eleganter reticulatis, infra pubescens, costa et nervis pilis longis



Fig. 1, *Hugonia faulknerae* Meikle. 1, flowering branch, $\times 1$; 2, stipule, $\times 4$; 3, flower-bud, $\times 2$; 4, calyx, $\times 1$; 5, outer sepal, outside view, $\times 3$; 6, inner sepal, outside view, $\times 3$; 7, petal, $\times 2$; 8, androecium, $\times 3$; 9, androecium cut open to show pistil, $\times 3$; 10, pistil, $\times 6$; 11, stigma, $\times 9$; 12, fruit, $\times 1$.

fulvidis ornatis, venulis valde prominentibus. *Petiolus* circiter 1 cm. longus, teres, dense fulvo-pilosus. *Stipulae* circiter 8 mm. longae, caducae, laciniaetae, lacinii 3-7 subulatis usque 6 mm. longis intus glabris vel subglabris dorso longe argenteo-villosis. *Flores* axillares, solitarii, pedunculo circiter 2 cm. longo hirsuto basi manifeste articulado. *Bractaeae* minutae, ovatae, acutae vel laciniaetae, dorso dense argenteo-villosae. *Sepala* subaequalia, persistentia, basi connata: 3 exteriora ovata, circiter 8 mm. longa et 4.5 mm. lata, apice subacuta, dorso sparse vel dense villosa, intus brevissime tomentosa; 2 interiora ovata, circiter 7 mm. longa et 5 mm. lata, apice obtusa, dorso sparsissime villosa, margine late membranacea, ciliata. *Petala* imbricata, conspicua, nitida, saturate lutea, cuneato-obovata, caduca, sepalis 3-plo longiora, usque 2.5 cm. longa et 1.4 cm. lata, basi unguiculata, apice minute ciliata. *Stamina* 10, uniseriata, alternatim longiora et breviora, longiora circiter 13 mm. longa, breviora circiter 7 mm. longa, filamentis complanatis glabris basi in tubum usque 2 mm. longum connatis. *Antherae* rotundae, 2 mm. diametro, 2-loculares, connectivo in appendicem penicillatam nonnunquam producto. *Styli* 3, usque 8 mm. longi, glabri, basi connati; stigmata 3, viridia, peltata, inaequaliter lobata. *Ovarium* pyriforme, 2.5 mm. longum et 1.5 mm. latum, glabrum, 3-loculare, ovulis solitariis pendulis. *Bacca* carnosa, ovoidea, circiter 18 mm. longa et 12 mm. lata; semina 3, parva. (Fig. 1, 1-12).

PORTUGUESE EAST AFRICA. Quelimane District. Lugela, Namagoa estate, in open forest, not common, Oct.-Nov. 1946, *Faulkner* K 80 (type), drawing no. 528:—a small bush; flowers sweet-scented. "Makua country", Namuli, *Last*, comm. 1887.

A very elegant *Hugonia*, with large finely reticulate-veined leaves and handsome glossy flowers. The soft whitish bark of the older shoots is particularly characteristic.

R. D. MEIKLE.

Robbairaea delileana *Milne-Redhead* in Kew Bull. **1948**, 452 (Jan. 1949). *Polycarpaea confusa* Maire in Bull. Soc. Hist. Nat. Afr. Nord, **39**, 129 (June 1949), *nom illegit.*

I am glad to see that Dr. René Maire agrees with me as to the need for a new epithet for *Alsine prostrata* Del. (1813), but regret that, after so many years, our respective publications should so nearly have coincided. By chance the epithet *delileana* is the earlier, and in consequence a new combination will be needed by those who, like Dr. Maire, prefer to retain the plant in *Polycarpaea*.

E. MILNE-REDHEAD.

GERANIACEAE

Geranium purpureum Vill., Pl. Delph. 72 (1785).

G. robertianum L. var. *purpureum* (Vill.) DC., Fl. Franç. **4**, 853 (1805); Knuth in Engler, Pflanzenr. IV, **129**, 66 (1912).

ERITREA. Mt. Alam Kalé, NW. of Aideresó, 5 Apr. 1892, *Schweinfurth* & *Riva* 1491.

KENYA. Third day's march from Eldama Ravine, Nov. 1898, *Whyte* s.n. Between Nandi and Mumias, 1400-1800 m., Nov.-Dec. 1898,

Whyte s.n. Knight's Gorge on slope of Kinang'op Escarpment, in damp shady places on rocky ground, 2340 m., Sep. 1934, *Albrechtsen* (*Coryndon Museum* 6687) :—an erect, hairy, slightly viscid herb, 3–6 dm. high, strongly scented like Herb Robert ; petals pale pink, the base of the claw white, without markings. Mt. Kinangop, in forest, c. 2650 m., Apr. 1938, *Chandler* 2249 :—height 3–4 dm., flowers pale pink. Mt. Kinangop, among undergrowth on forest path, 2400 m., 22 Dec. 1930, *Napier* 729 :—flowers pinky mauve. Ol-joro-Orok, 2300 m., Jan. 1932, *Pierce* (*Coryndon Museum* 1682). West Mt. Kenya, in Juniper forest at Nanyuki, 2100 ft., Jan. 1931, *A. W. Hill in Kenya For. Herb.* 2526 :—stems red.

Knuth (l.c.) cites three gatherings from Eritrea, all made by Schweinfurth, and also gives "Uganda (Wight sub nom. *G. ocellatum* !)". There is little doubt that this was an incorrect citation of the *Whyte* specimens cited above, both of which come from Kenya. These two sheets are merely labelled "Tropical East Africa" and, together with two of the other specimens here cited, had been named *G. ocellatum* Camb. Whilst it is recognized that critical investigation may reveal infra-specific differences between these African plants and the European species, I am following Knuth in treating them as *G. purpureum* Vill. in the broad sense. The occurrence of *G. purpureum* in Kenya is yet another example of the north temperate element in the flora of the East African equatorial mountains.

E. MILNE-REDHEAD.

FLACOURTIACEAE

Dasylepis eggelingii Gillett, sp. nov. ; *D. leptophyllae* Gilg affinis, statura minore, pedunculo longiore, floribus omnibus ♂, ovario styloque lanuginoso, stylo crassiore, placentis ramisque stigmaticis 4, differt.

Frutex ; ramuli virides, glabri. *Folia* glabra, chartacea, oblongo-lanceolata vel oblanceolata, apice acute acuminata, basi plus minusve late cuneata, margine remote sed manifeste serrato-dentata, 12–19 cm. longa, 3·5–7 cm. lata ; nervi laterales 6–8 et veni numerosissimi reticulati, supra parce, subtus alte, prominentes ; petiolus glaber, 6–12 mm. longus, supra sulcatus. *Racemi* axillares, multiflori, glabri, pedunculo 2–4 cm. longo incluso, ad 18 cm. longi ; bracteae minimae ; pedicelli tenues, basi articulati, 12–17 mm. longi. *Flores*, ut videtur, semper ♀. *Sepala* 5, libera, glabra, rigida, concava, ad 7 mm. longa, 6 mm. lata, 3 exteriora quam 2 interiora rigidiora intensiusque colorata. *Petala* c. 7, quorum intimum, vel duo intima, in stamina transeuntia, intus marginem pilosa, membranacea, ad 7 mm. longa, 2·5 mm. lata, basi intus valde callosa, callo lanuginoso 1·5 mm. longo 1 mm. lato. *Stamina* 25–30, hypogyna, libera vel hic inde basi leviter coniuncta ; filamenta 4–6·5 mm. longa ; antherae sagittatae, lobis basalibus divergentibus ad 1 mm. longis inclusis, ad 3 mm. longae. *Ovarium* lanuginosum, globosum, 3–4 mm. diametro, in stylum conicum lanuginosum 3 mm. longum sensim attenuatum, hinc facie ovoideum ; placentae parietales, pluriovulatae, 4 ; stigmatis rami 4, valde reflexi, longitudine inaequales, ad 2·2 mm. longi. *Fructus* pubescens, globosus, 1·8 cm. diametro, pericarpio lignoso, 1 mm. crasso, intus coriaceo. *Semina* pauca (c. 3), inaequaliter angulata, c. 7 mm. lata, atro-brunnea.

UGANDA. Ankole District. Kalinzu forest, c. 1500 m., June 1938, *Eggeling* 3710 (type) :—common shrub up to about 3 m., flowers decorative in pendulous racemes, calyx pink, petals white. Toro District. Kibale forest, c. 1500 m., May 1938 *Eggeling* 3631 :—understorey shrub 3 m. high, fruits purple-red in pendant bunches. Same area, July 1935, *Eggeling* 2111 (collected by Miss M. E. Fountaine) :—bush in forest, flowers pink (in bud).

As the "petals" and "sepals" are sharply distinct, these terms, which were those used by Oliver in his original account of the genus, seem more appropriate than the "inner and outer perianth segments" of Gilg.

J. B. GILLETT.

MELASTOMATACEAE

***Osbeckia rhinanthifolia* Brenan, nom. nov.**

Osbeckia scaberrima Exell in Journ. Bot. **66**, Suppl. I, 176 (1928), non Hayata in Journ. Coll. Sc. Tokyo **30**, Art. 1, 115 (1911), *nom. illegit.*

J. P. M. BRENNAN.

***Dissotis elliotii* Gilg var. *setosior* Keay et Brenan, var. nov.** ; a typo differt caulibus etiam inferne squamis denticulatis plus minusve dense indutis, foliis supra setulis manifestioribus apice a laminae superficie liberis subtus setulis non appressis longioribus basi denticulatis densius vestitis utrinque scabris.

NIGERIA. Ogoja Prov., Obudu Division. Balleghete, 18 Jan. 1929, *Rosevear* 4/30 (Herb. Kew). N. side of Koloishe, in savannah grassland on moist rocky slope at head of small ravine, 1525–1650 m., 21 Dec. 1948, *Savory & Keay in For. Herb., Ibadan* 25080 (typus varietatis in Herb. Kew, Herb. Paris) :—coarse erect herb to 1–1.4 m. high ; stem green below, red-purple above ; petals deep violet. Grass Plateau, Ikweite, in moist grassland with *Maesa* shrubs at head of valley, 1585 m., 30 Dec. 1948, *Savory & Keay in For. Herb., Ibadan* 25236 (Herb. Kew) :—tall herb ; stem dark crimson ; leaves with pink nerves and midrib beneath, pale green above ; calyx-tube green, lobes pink, conspicuous in bud ; petals purple ; anthers yellow.

Typical *Dissotis elliotii* Gilg (in Engl., Monogr. Afr. Pfl. **2**, 19 : 1898), which was described from Sierra Leone, ranges as far eastwards as Bamenda in the British Cameroons ; it has stems smooth or sparsely scaly, sometimes more densely so in the inflorescence-region only ; the leaves are almost smooth to the touch above, the bristles although numerous appearing as short discolorous ridges fused with but slightly raised above the leaf-surface ; the under-surface is similar but the bristles are sparser and almost concolorous. The new variety described here has been found only in one area of eastern Nigeria. It differs in the greater development of indumentum on the stems and leaves ; the floral parts are similar. A single specimen in Kew Herbarium from the Bauchi Plateau in Nigeria (Vom, 915–1370 m., 1922, *J. Dent Young* 99) seems to be intermediate between typical *D. elliotii* and var. *setosior*, having smooth stems but leaves nearly as bristly as var. *setosior*.

U. W. J. KEAY & J. P. M. BRENNAN.

COMBRETACEAE

***Combretum butyrosium* (Bertol. f.) Tul.** in Ann. Sci. Nat., sér. VI, **4**, 87 (1856) ; Engl. et Diels in Engl., Monogr. Afr. Pfl. **3**, 81 (1899).

Sheadendron butyrosum Bertol. f., Ill. Piante Mozamb. **1**, 12, t. 4a & b (Mem. Acad. Sci. Istit. Bologna **2**, 72 : 1850).

KENYA. Nwachi, 1928, *R. M. Graham in Kenya For. Herb.* 1685 (with flowers, in Kew Herb. & Brit. Mus. Herb.) :—climber on low bush ; flowers white and sweetly scented.

This species was originally described from a specimen (*Fornasini* s.n.) collected in Mozambique, but was omitted from Lawson's account of the genus in Oliver's Flora of Tropical Africa. *Graham* (*Forest Herb.* 1685) from Kenya is the first specimen in the Kew Herbarium to be identified as *C. butyrosum*, and in the British Museum Herbarium the only other specimen is a fragment of what is evidently a specimen authenticated by G. Bertoloni himself. Unfortunately Graham's specimen does not include fruits and it is hoped that these may be collected in due course. According to Bertoloni's lithograph the fruits are of the wingless bulky type characteristic of other species of §*Chionanthoideae* Engl. & Diels.

R. W. J. KEAY.

HYPERICACEAE

Hypericum scioanum Chiov. in Ann. Bot. Rom. **9**, 317 (1911).

H. stolzii Briq. in Ann. Conserv. & Jard. Bot. Genève. **20**, 391 (1919).

H. thoralfi T. C. E. Fries in Notizbl. Bot. Gart. Berl. **8**, 566 (1923).

H. afropalustre Lebrun and Taton in Bull. Jard. Bot. Brux. **18**, 279 (1947).

The known distribution of *H. scioanum* Chiov. is cited under *H. stolzii* in Kew Bull. **1948**, 455 (1949), but *Humbert* 7503 and *A. S. Thomas* 1058, which are *H. humbertii* Staner and not this species (see below), should be deleted, and the following added :—

ABYSSINIA. Shoa (Scioa) province, Entotto hill, lesser Cabanna valley, beneath *Erica*, 2600 m., 27 Apr. 1909, *Negri* 332 (type in Florence Herb.). Shoa, 1887, *T. Gennari*, s.n. (Florence).

BELGIAN CONGO. Foot of Mt. Mikeno, great Kikeri marsh, in peat, Nov. 1937, *Lebrun* 8512 (type of *H. afropalustre*) :—stem prostrate, rooting at the nodes, flowers yellow slightly orange.

We have been able to examine the type specimen of *H. scioanum* through the courtesy of Dr. Pichi-Sermolli of Florence, and find no specific difference between it and *H. stolzii*, *H. thoralfi* and *H. afropalustre*. Dr. Negri's plant, as compared with the east African material, has slightly narrower leaves, more pointed at base and apex. However Dr. Gennari's specimen is intermediate in this respect and the difference is, at most, of varietal rank.

J. B. GILLET & E. MILNE-REDHEAD.

Hypericum humbertii Staner in Bull. Jard. Bot. Brux. **13**, 69 (1934).

BELGIAN CONGO. Kanzibi marsh, in mountains west of Lake Kivu, Jan. 1929, *Humbert* 7503 (type).

UGANDA. Kigezi District. Behungi, in swamp meadow, 2100 m., 19 Dec. 1933, *A. S. Thomas* 1058 :—common, prostrate, woody, ascending

to 60 cm. ; flowers tawny yellow. Kanaba Gap, in swamp, 2400 m., June 1946, *Purseglove* 2073 :—herb to 50 cm., flowers yellow. Kanaba Gap, in swampy valley, Oct. 1947, *Purseglove* 2480 :—procumbent herb, flowers orange.

In the Kew Bulletin **1948**, 455 (1949) the opinion was expressed that *H. humbertii* is not distinct from what is here recognised as *H. scioanum* Chiov. (*H. stolzii* Briq.). However on re-examining the question in the light of further material and the characters used by Robyns (Flore du Parc Nat. Alb. **1**, 617–620 : 1948) we consider that this was a mistake and that *H. humbertii* is in fact specifically distinct. The characters separating the two species are as follows :—

Leaves cordate-amplexicaul at the base, sepals 5–6 mm. long, petals 6–8 mm. long, stamens in 3 groups of 12–15 *humbertii*

Leaves $\pm$ rounded at the base, sepals 3–4 mm. long, petals 4–5 mm. long, stamens in 3 groups of 5–9 *scioanum*

It is very difficult to distinguish stout forms of *H. scioanum* from stunted *H. humbertii* without counting the stamens.

J. B. GILLET & E. MILNE-REDHEAD.

SCYTOPETALACEAE

Brazzeia longipedicellata Verdcourt sp. nov., *B. tholloni* Baill. affinis, sed pedicellis usque 4 cm. longis valde differt.

Arbor parva, usque 5–8 m. alta, sempervirens ; ramuli tenues, 1–3 mm. diametro, flexuosi, apicibus in calcaria circiter 5 mm. longa productis, glabri, supra sat nitidi brunnei, subtus ob epidermidis decorticationem griseo-brunnei vel albidii ; epidermis minute reticulata. *Internodia* usque 1–3 cm. longa, suprema oblique torta. *Folia* glabra, subcoriacea, supra griseo-olivacea, opaca, subtus siccitate brunnescentia, elliptica, acuminata, 4–12 cm. (plerumque 9 cm.) longa et 2–5 cm. (plerumque 4 cm.) lata ; lamina basi obliqua, latere altero 1–2 mm. longiore, acumine 1–1.5 cm. longo cuspidata, latere superiore 1.5 mm. lato, apice subobtusa. *Costa* subtus brunnescens, longitudinaliter minute striata ; nervi laterales utrinque 4–5, arcuati, adscendentes, supra obscuri, subtus sat prominentes, venae et venulae vix distinctae, nec impressae nec prominentes, lamina inter nervos leviter rugosa. *Petoli* breves, crassi, usque 3 mm. longi, alii brunneo-flavescentes, suberosi, rugosi, alii saturate brunneo-rufescentes, longitudinaliter minute striati. *Flores* in fasciculos trifloros ad ramos maturos copiose aggregati ; alabastra conica ; pedicelli circiter 4 cm. longi. *Calyx* cupularis, usque 12 mm. diametro, alabastro corollae arcte adpressus, primo subinteger vel subcrenatus vel irregulariter 3–4 lobatus, postea in lobos subtruncatos circiter 7 fissus. *Corolla* alba, carnosa, usque 3 cm. diametro, primo indivisa, postea in lobos subaequales vel inaequales irregulariter fissa, parte interiore costata ; corolla (teste Purseglove) demum reflexa et cum staminibus affixis caduca. *Stamina* numerosa, filamentis usque 6 mm. longis liberis vel basi usque ad medium rarissime geminato-connatis ; antherae flavae, elongatae, usque 3.5 mm. longae et 0.5 mm. latae, apice poris dehiscentes. *Ovarium* superius, globulare, circiter 4 mm. diametro, pericarpio crasso 6-loculare ; ovulae numerosae (circiter 100), axiles ; stylus 9–10 mm. longus, 0.5 mm. latus, linearis ; stigma parvum, vix capitatum, obscure 5-lobatum. *Infructescentiae* pedicelli usque 4 cm. longi. *Capsula*

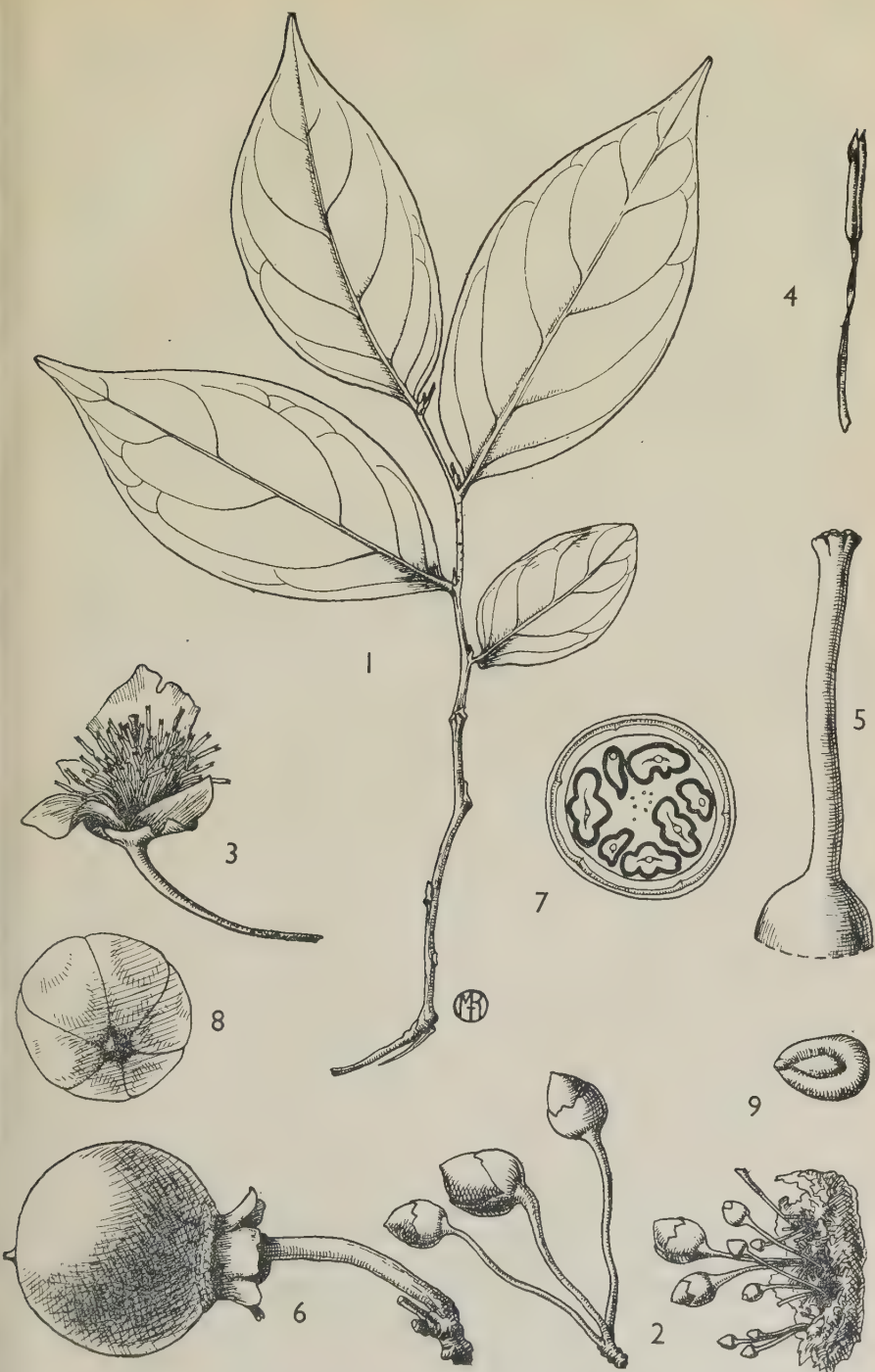


Fig. 2, *Brazzeia longipedicellata* Verdcourt. 1, leafy branch, $\times 2/3$; 2, flower-buds $\times 1$; 3, flower, $\times 1$; 4, stamens, $\times 4$; 5, style and stigma, $\times 4$; 6, fruit, $\times 1$; 7, cross section of fruit, $\times 1$; 8, seed-mass, $\times 1$; 9, seed, $\times 1$.

globosa, lignosa, usque 2.8 cm. diametro, sulcis 6-7 obscurissimis superne notata, siccitate costis angustis 6-7 longitudinaliter striata; pericarpium vivum c. 2.5 mm., siccitate c. 1 mm. crassum, parte exteriori sat rugosum, basi annulo pallido rugoso (? cicatrice corollae delapsae) notatam, et calyce reflexo persistente conspicue ornatum, parte interiori brunneum nitidum nacreum. *Semina* circiter 8, elliptica, compressa, subtus fovea irregulari ornata, supra umbone centrali a margine canaliculo elliptico separata, omnia inter pilos glutinosos dense conglomerata, siccitate capitulum solutum viscosum efformantia. (Fig. 2, 1-9).

Small glabrous evergreen tree from 15-25 ft. tall or less. Ultimate branchlets narrow 1-3 mm. in diameter, surface somewhat obscured by the growth of epiphytic cryptogams in the available material, youngest parts somewhat shining brown, lower parts greyish brown or whitish due to the fact that the brown microscopically reticulate epidermis has peeled off. These lower portions are partly discoloured by cryptogamous growths. Branchlets somewhat zigzag, i.e. internodes forming very obtuse angles with each other. There is a particularly noticeable angle between the terminal internode and the rest of the shoot below it. Internodes 1-3 cm. long. The apical, apparently terminal leaf is, of course, not truly terminal, and in fact to the left of the base of its petiole may be seen a short narrow spur about 5 mm. long and of the same colour as the young stem. This represents the aborted apex of the branchlet. Leaves glabrous, subcoriaceous, greyish olive-green and dull above, mostly brownish beneath in the dry state, elliptic, acuminate, 4-12 cm. (mostly 9 cm.) long, 2-5 cm. (mostly 4 cm.) broad. Acumen 1 to 1.5 cm. long, somewhat obtuse at apex where it is about 1.5 mm. broad. Leaves appearing sessile but actually with a short thick petiole about 3 mm. long. Some of the petioles are yellowish brown, rather corky and rugose, due to a covering resembling the stem epidermis, but the others are deep reddish brown and minutely longitudinally striate. The petioles are partly obscured because the leaves are unequal at the base, the lower half of the lamina joining the petiole 1-2 mm. further down than the upper half. Mid-vein brownish below, minutely longitudinally striate, lateral veins 4-5 on each side, arcuate-ascending, somewhat raised below and obscurely raised above, secondary and tertiary veinlets visible only as darker green lines beneath, not impressed nor raised. Between the main veins the lamina is slightly but distinctly rugose. Plant cauliflorous, flowers fleshy in clusters on the old wood. Each cluster is made up of numerous groups of three flowers. Pedicels of mature flowers about 4 cm. long. Calyx cupular, 12 mm. diam., in bud closely adpressed to the corolla, at first sub-entire or irregularly 3-4 lobed, but later tearing into a number of sub-truncate lobes (often 7 but indefinite). Corolla white, fleshy, conical in bud, and not divided into regular lobes, but as the bud grows tearing irregularly into 3-4 subequal or quite unequal parts with ribbed interior surfaces and irregular margins, finally (according to Pursglove) curving back and falling off with the stamens attached to it. The mature flower is about 3 cm. across. Stamens very numerous, largest filaments about 6 mm. long, free or rarely two joined together for about half their length at base. Anthers yellow, innate, elongate, 3.5 mm. long, 0.5 mm. broad, opening by apical pores. Ovary superior, globular, about 4 mm. in diameter, wall thick,

6-locular perhaps incompletely so at the base. Ovules numerous (± 100), placentation axile. Style 9–10 mm. long, 0.5 mm. broad, linear; stigma a slight thickening at its end, obscurely five lobed. Fruiting pedicel 4 cm. long. Fruit a spherical indehiscent capsule up to 2.8 cm. diameter, pericarp woody about 2.5 mm. thick when fresh and 1 mm. thick when dry, with 6–7 very obscure grooves in the upper part when fresh, and with 6–7 narrow raised longitudinal ribs when dry, the areas between these ribs being somewhat rugose; an annular area round the base, near the calyx, paler and rougher, probably scarred by the fallen corolla. Inner surface of pericarp covered with a brownish shining nacreous layer. Seeds about eight, elliptic, compressed with an irregular depression below, and an elliptical depression above which separates a smooth annular area from the central raised rugose boss. Seeds stuck together in a mass of sticky hairs to form a solid sphere which, in the dry condition, rattles in the capsule.

UGANDA. Kigezi District. Kayonza, Ishasha Gorge, stream-side in forest, 1200 m., Mar. 1946. *Purseglove* 2002 (type):—tree 7.5 m., cauliflorous; perianth fleshy, white, anthers yellow, fruit globular, orange, later brown, 2.5 cm. in diameter; vernacular name *Omushabarara*. Ishasha Gorge, rare on the banks of a rocky stream with *Allanblackia* and *Chrysophyllum* in *Piptadenia b Buchananii*–*Parinari excelsa* evergreen rain forest on the steep banks of a rocky gorge, c. 1500 m., 10 Febr. 1945, *Greenway & Eggeling* 7105 (paratype in Amani Herb. and Kew Herb.):—a small evergreen tree up to 4.5 m. tall with large round green plum-like fruits produced in clusters from the stem and older branches on long pedicels. Ishasha Gorge, *Purseglove* 3059 (flower buds and fruits in spirit).

Engler* separates *Brazzeia* from *Pseudobrazzeia* as follows:—

- “ α) Fruit a loculicidal many-seeded capsule *Brazzeia*
 β) Fruit indehiscent.

I. Fruit globose with evanescent septa, mostly four-seeded

Pseudobrazzeia”

Our material of the fruit of *P. tholloni* is inadequate but the pericarp would appear to lack the ribs and the number of seeds is greater than four. Further information concerning dehiscence is required for though the fruits of our *Brazzeia* material at Kew are ribbed in a similar manner to those of the new species it is doubtful whether the capsule is truly loculicidal in any of the species. The writer doubts very much if it is wise to maintain *Pseudobrazzeia* as a genus separate from *Brazzeia*. To enable field workers more easily to recognise this interesting tree, a full description in English is given above.

Brazzeia longipedicellata is apparently the first member of the *Scytopetalaceae* to be recorded for East Africa. Mr. H. K. Airy Shaw is of the opinion that this family is quite wrongly placed after the *Tiliaceae* and that its members should be transferred to the *Olacaceae* or at least near it, in which family it is interesting to note the first described member, namely *Rhaptopetalum coriaceum* Oliv. (in Journ. Linn. Soc. Bot. **8**, 160 : 1865) was placed. The writer wishes to thank Mr. J. W. Pursglove of the Department of Agriculture, Uganda, for obtaining a gathering of the flower-buds and fruit of *B. longipedicellata* preserved in spirit solution, which material has enabled a more accurate description to be prepared.

B. VERDCOURT.

*Engl. Pflanzenw. Afr. **3**(2), 471 (1921).

STERCULIACEAE

Pterygota macrocarpa K. Schum. in Engl., Monogr. Afr. Pl. 5, 135 (1900).

This species is based on two gatherings, both said to be of unnamed collectors. The first, at Berlin, was from Victoria, whilst the second, from the Congo, was no. 836 and was said to be in the Brussels Herbarium. Through the kindness of Prof. W. Robyns, I have been able to examine this Brussels specimen. I find it is *Dewèvre* 836 and that it came from Lukolela, which is on the River Congo between Leopoldville and Coquilhatville. The specimen consists of a single large leaf, and it is clearly not the specimen from which Schumann drew up his diagnosis. The type of the above specific name must therefore be the specimen from Victoria in the British Cameroons. There are at Kew some excellent specimens of a species of *Pterygota* from Victoria, and these agree well with Schumann's description. To these I propose to apply the name *P. macrocarpa* K. Schum. Whilst it is not at present possible to say definitely that *Dewèvre* 836 is not conspecific with *P. macrocarpa*, it seems more likely that it is referable to a species of which I have seen a number of specimens from the Belgian Congo and from Uganda, and to which I have not yet been able to give a name. This tree has smaller flowers than those of *P. macrocarpa*, covered with a golden indumentum, and the fruiting foliicles have a comparatively short stipe, whilst the larger flowers of *P. macrocarpa* have a greenish indumentum, and the stipe of the fruiting foliicles is from 5–8 cm. long. The anthers of the only specimen with male flowers that I have examined are remarkably different from those of *P. macrocarpa*.

BRITISH CAMEROONS. Victoria, collector unknown, type in Berlin Herb. Victoria, at sea level (also on the slopes of the hills), Nov. 1927, *Maitland* 90 (fruit and mature leaves) :—a tall straight-boled tree with small crown and buttressed trunk. Victoria, at sea level, March 1929, *Maitland* 445 (mature leaves). Victoria, at sea level, Nov. 1929, *Maitland* 769 (flowers). Likomba Plantation, 15–35 Km. NE. of Victoria, 22 Nov. 1928, *Mildbraed* 10701 :—tall tree ; fallen leaves and flowers collected.

E. MILNE-REDHEAD.

EUPHORBIACEAE

Phyllanthus rotundifolius Klein ex Willd., Sp. Pl. 4, 584 (1805) ; Hutch. in Dyer, Fl. Trop. Afr. 6(1), 731 (1912).

SENEGAL. Recorded by Trochain, Contrib. Étude Végét. Sénégal, 381 (1940).

FRENCH SUDAN. Timbuktu, 4 July 1927, *Hagerup* 147 :—near water ; height 1/8–1/2 m. ; flowers white-green ; fruits black. Timbuktu, *Hagerup* 158a. Both the *Hagerup* specimens have been identified with *P. niruri* L., which they are not.

This species, with a range extending from the Cape Verde Islands to India, is to be added to the Flora of West Tropical Africa. In that work it will key straight down to *P. niruri* L., from which *P. rotundifolius* may be easily distinguished by the stems and often the leaves being usually scabrid

with numerous small pointed papillae, by the round or rounded-obovate leaves, and by the disc of the ♀ flowers which is annular and merely faintly crenulate, not deeply toothed.

J. P. M. BRENNAN.

Adenocline acuta (Thunb.) Baill., Étud. Gén. Euph. 457 (1858) ; Pax in Engl., Pflanzenr. IV. 147 (vii), 410 (1914).

Acalypha acuta Thunb., Fl. Cap. (ed. Schult.) 546 (1823).

NYASALAND. Plateau of Mt. Zomba, 1500–1800 m., Whyte s.n. Zomba Plateau, at side of Mulungusi Stream, 1500 m., 27 Mar. 1937, Lawrence 319 :—plant 0.9–1.2 m. tall, much branched ; ribs on stem ; flowers green ; fruit 3-lobed.

A specimen of this South African species, collected in Nyasaland by Whyte, was recently discovered at the end of the *Umbelliferae* at Kew, where it appears to have reposed since J. G. Baker suggested it might represent a species of *Spananthe*. The sheet bears a stamp showing 5th June 1897 as the date of its receipt at Kew, but no date of collecting was given. On looking through the South African covers, a second Nyasaland sheet was discovered, this having been collected as recently as 1937.

A. acuta is widely spread in the Cape Province and Natal, whilst it reaches Barberton in the eastern Transvaal. The occurrence in Nyasaland is a very marked extension of range, but there is no reason to believe that it is not native in this tropical locality. It seems likely that, when the mountains of the Southern Rhodesia–Mozambique border are more thoroughly explored, intermediate stations for *A. acuta* may be found.

E. MILNE-REDHEAD.

LEGUMINOSAE

Crotalaria grandistipulata Harms in Engl., Bot. Jahrb. 28, 399 (1900).

[*Crotalaria lachnocarpa* (non Hochst. ex Bak.).—Bak. in Oliv., Fl. Trop. Afr. 2, 33 (1871), pro parte, quoad spec. Welw. ; Hiern, Cat. Afr. Pl. Welw. 1, 202 (1896) ; Harms in Warb., Kunene-Samb. Exped. 254 (1903) ; Bak. f. in Journ. Linn. Soc. 42, 404 (1914) & Leg. Trop. Afr. 57 (1926), pro parte, quoad syn. *grandistipulata*, and in Journ. Bot. 66, Suppl. I, 101 (1928), pro parte, quoad spec. no. 3087.]

BELGIAN CONGO. Katanga Province. Kundulungu Mts., between rocks, 12 Mar. 1908, Kassner 2574. Elisabethville, 1935, Quarré 4420.

TANGANYIKA. Iringa District. Matanana Plateau [near the headwaters of the Little Ruaha River] in light bush, 1800 m., Mar. 1899, Goetze 737 (type in Berlin Herb., not seen by me) :—vernacular name *muhumbu*.

NYASALAND. North Nyasa District. Njakwa, 16 Febr. 1947, Benson 1177.

NORTHERN RHODESIA. Broken Hill District. Mulungushi River near Broken Hill, Febr. [1907], Allen 487 :—bushy shrub, 9–12 dm. Solwezi District. Mutanda Bridge, among dry grass in *Brachystegia* woodland, 26 June 1930, Milne-Redhead 601 :—perennial with thick

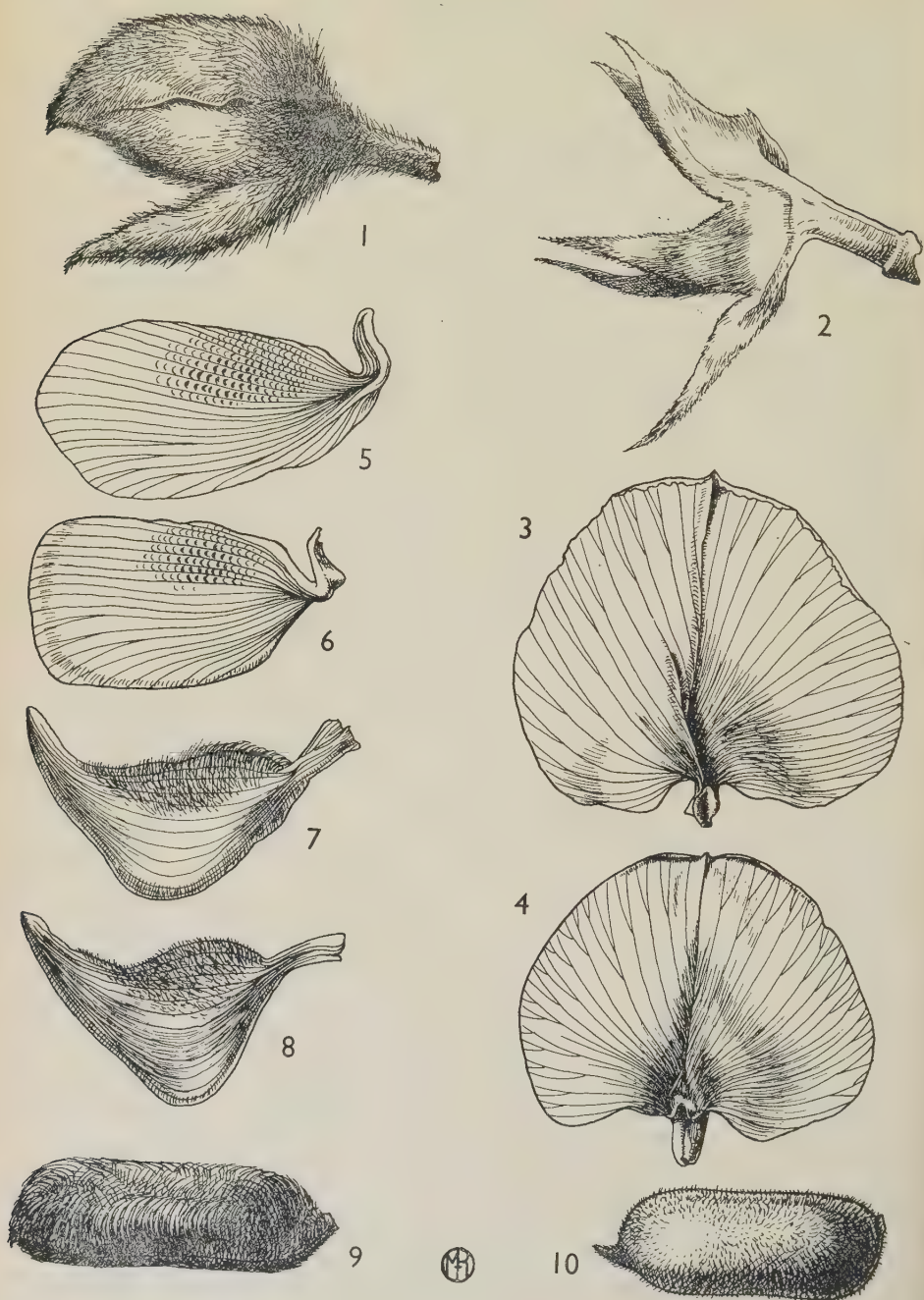


FIG. 3. 1, 3, 5, 7 and 9. Calyx, standard, wing, keel and fruit of *Crotolaria lachnophora* A. Rich. 2, 4, 6, 8 and 10. Calyx, standard, wing, keel and fruit of *Crotolaria grandistipulata* Harms. Fruits natural size; other parts $\times 2$.

root ; shoots 6 dm. high ; seeds chestnut-coloured. Mwinilunga District. [Probably Kalene Hill], in bush on sandy soil, Febr. [1929], *J. M. Marks* 14 :—shoots 6 dm. high ; leaves light green ; calyx with silvery hairs ; flowers bright yellow, flame, and deep red, without scent. Luakera Falls, N. of Mwinilunga, on sandy ground in *Brachystegia* woodland, 25 Jan. 1938, *Milne-Redhead* 4331 :—same as *Milne-Redhead* 4150 [see below].

ANGOLA. Moxico District. E. of R. Zambezi and S. of R. Luhanda, in *Brachystegia*—*Isoberlinia* woodland on sand, 15 Jan. 1938, *Milne-Redhead* 4150 :—roots narrow, vertical, over 3 dm. long ; stems greyish, pubescent ; leaves and stipules dull green ; calyx pale green ; petals at first yellow with few red lines at base of standard, later standard and wings becoming coppery-orange ; keel greenish-yellow. Bié District. R. Longa near Minnesera, on sand, 1200 m., 7 Jan. 1900, *Baum* 46 (K., B.M.) :—stems 5 dm. high ; flowers bright yellow. Rare in short thicket-grown pastures at the mouth of R. Cuatiri, 16 Apr. 1906, *Gossweiler* 3087 (K., B.M.) :—a biennial undershrub ; primary stem branched some 4·5 dm. above ground ; branches short ; flowers yellowish shaded brown. Rather rare in abandoned maize plantations near the Sambala Mucuba, left bank of R. Cuchi, 26 Dec. 1912, *Gossweiler* 2438 (B.M.) :—a branched or suffruticose shrublet, total height 12 dm. ; stem erect ; branches ascending ; flowers showy, sulphur-yellow and red-brown. Bié, 1300 m., 1930, *Gossweiler* s.n. (B.M.) Huila District. Catumba in the territory of Lopolo, sporadic in wooded meadows, Dec. 1859, *Welwitsch* 1916 (K., B.M.) :—an erect leafy perennial herb, 3–4·5 dm. high ; flowers deep yellow soon turning purple ; petals as well as the leaflets rather thick and rigid. Cuanza Norte District. Pungo Andongo, sporadic by moist thickets near Lombe, Mar. 1857, *Welwitsch* 1915.

For long this species has been confused with its close ally, *Crotalaria lachnophora* A. Rich. (syn. *C. lachnocarpa* Hochst. ex Bak.), a species of considerably larger size, and usually much branched habit. *C. grandistipulata* has, at least early in the season, simple erect stems which arise annually from a long narrow vertical rootstock. The indumentum of the pedicels and calyx is adpressed and often silvery, whilst the lobes are attenuate and separate in anthesis. In *C. lachnophora* the indumentum of the pedicels and calyx is spreading and tawny, and the calyx lobes are broader, suddenly narrowed to a point, with the lateral ones cohering in pairs at flowering time. Fig. 3.

Whilst the distributions of these two species overlap, that of *C. grandistipulata* is definitely more restricted, and as will be seen from the above citations it is not known from north of the 8°S. latitude. The type locality is on the watershed of the Great and Little Ruaha Rivers at about the place where the Iringa-Njombe motor road now crosses it. As this is the *locus classicus* of a number of species collected by Goetze, the types of which are now lost, it is highly desirable that further collections be made from this easily reached locality in March, which was the month that Goetze visited it some 52 years ago.

E. MILNE-REDHEAD.

Indigofera subulata Vahl ex Poir. in Lam., Encycl. Suppl. 3, 150 (1813) ; DC., Prodr. 2, 223 (1825) ; Bak. in Oliv., Fl. Trop. Afr. 2, 87 (1871), pro

parte ; Bak. f. in Journ. Bot. **41**, 263 (1903) & in Leg. Trop. Afr. 146 (1926).

I. thonningii Schumach. et Thonn., Beskr. Guin. Pl. 366 (1827).

[*I. trita* (non Linn. f.)—Bak. in Oliv., Fl. Trop. Afr. **2**, 86 (1871) ; Taub. in Engl. Pflanzenr. Ost.-Afr. **C**, 210 (1903) ; Bak. f., Leg. Trop. Afr. 144 (1926).].

var. **scabra** (Roth) Meikle, comb. nov.

I. scabra Roth, Nov. Pl. Sp. 359 (1821) ; Spreng., Syst. Veg. **3**, 277 (1826).

I. flaccida König ex Roxb. [Hort. Beng. 98 (1814), *nomen nudum*, et] Fl. Ind., **3**, 375 (1832), *descr.*

I. mucronata Spreng. ex DC., Prodr. **2**, 227 (1825) ; Rydberg in N. Amer. Fl. **24**, 145 (1923), non Lam., Encycl. **3**, 247 (1789), *nom. illegit.*

I. retroflexa Baill. in Bull. Soc. Linn. Paris **1**, 399 (1833) ; Bak. f. in Journ. Bot. **41**, 263 (1903) & in Leg. Trop. Afr. 145 (1926).

?*I. jamaicensis* Spreng., Syst. Veg. **3**, 277 (1826).

Attempts to distinguish *I. subulata* Vahl ex Poir., with three leaflets, from *I. scabra* Roth (*I. mucronata* Spreng. ex DC.), with five or more leaflets, have given rise to considerable confusion. Apart from the number of leaflets there is little to separate the two plants ; *I. subulata* tends, perhaps, to have smaller leaves and flowers and shorter pods than *I. scabra*, but this is not always the case, and, failing to discover additional distinctive characters, I have decided that the most satisfactory arrangement is obtained by treating the latter as a variety of the former. It is a pity that the more uncommon of the two plants, the trifoliate *I. subulata*, should have to be the species, and the more widespread *I. scabra* the variety, but under the present rules of nomenclature this unfortunate result cannot be avoided.

Typical 3-foliate *subulata* is entirely African, predominating in West Africa, where Thonning first collected it ; further south and east the 5- or more foliolate var. *scabra* becomes increasingly abundant, and in East Africa both seem to be equally common. The var. *scabra* is also widely distributed in Central and South America, the West Indies, Madagascar, India and Tropical Asia.

With regard to the synonymy : *I. mucronata* Spreng. ex DC. must be rejected, not only as a later synonym of *I. scabra*, but as a later homonym of *I. mucronata* Lam. (= *I. cytisoides* (Linn.) Murr.). De Candolle seems to have overlooked the fact that he had previously (Prodr. **2**, 223 : 1825) made the same species synonymous with *I. subulata* Vahl ex Poir.

Baker (Fl. Trop. Afr. **2**, 86–87, also Fl. Brit. Ind. **2**, 96–97) distinguishes 3-foliate and 5-foliate plants under the names *I. trita* Linn. f. and *I. subulata* Vahl respectively, but Thonning's material of the latter species, made available through the courtesy of the authorities at Copenhagen and Florence, is all trifoliate, so that the name cannot be used for 5-foliate plants. The occurrence in Africa of genuine *I. trita* Linn. f. is somewhat doubtful ; with the possible exception of four specimens (A.-E. Sudan, Andrews A. 98 and A. 121, Kenya, R. E. & T. C. E. Friess 188, Tanganyika, Rounce 48), all the material so named at Kew consists of various forms of *I. subulata*, and it is clear that the name *I. trita* has been

employed by several authors in an extended sense to include both *I. subulata* and *I. subulata* var. *scabra*. The four specimens mentioned above may be forms of *I. trita*, but their inflorescences are in every case considerably longer and more lax than those of the true Indian plant, and I would prefer, for the present, to regard them as forms of *I. subulata*. The relationship of *I. trita* with *I. subulata* is undoubtedly a close one, but the differences in habit, inflorescence and infructescence seem to be real and constant.

Type material of *I. retroflexa* Baill., kindly lent by the Director of the Muséum Nationale d'Histoire Naturelle, Paris, appears to be in no way distinct from *I. subulata* var. *scabra*. Baillon does not comment on the affinities of *I. retroflexa* in his brief description of the species.

Dolichos falcatus Klein ex Willd., Sp. Pl., ed. 3, 1047 (1802) ; DC., Prodr., 2, 398 (1825) ; Spreng., Syst. Veg., 3, 249 (1826) ; Roxb., Fl. Ind., 3, 311 (1832), excl. syn. ; Wight & Arn., Prodr. Fl. Pen. Ind. Or., 1, 249 (1834) ; Thwaites, Enum. Plant. Zeylan., 90 (1859) ; Bak. in Hook., Fl. Brit. Ind., 2, 211 (1876) ; Trimen, Hand. Fl. Ceyl., 2, 77 (1894) ; Alston in Year-Book, Dept. of Agr., Ceylon (1927), 33, t. VIII and in Kandy Flora, 30, t. 157 (1938) ; non Burt Davy, Man. Fl. Pl. & Ferns Transv., 423 (1932).

D. debilis Hochst. ex A. Rich., Tent. Fl. Abyss., 1, 223 (1847) ; Bak. in Oliv., Fl. Trop. Afr., 2, 213 (1871) ; Taub in Engl., Pflanzenw. Ost-Afr., C, 224 (1895) ; Harms in Engl., Pflanzenw. Afrik., III, 1, 678 (1915) ; Bak. f., Leg. Trop. Afr., 449 (1929).

D. andongensis Welw. ex Bak. in Oliv., Fl. Trop. Afr., 2, 213 (1871) ; Hiern, Cat. Welw. Afr. Pl. 1, 264 (1896) ; Bak. f., Leg. Trop. Afr., 449 (1929).

[*D. trilobatus* (non L.).—Wall Cat. 5541, *nomen nudum*.]

ABYSSINIA. "In rupibus vallis Mai-Mezano prope Djeladjeranne", 4 Sept. 1840, *Schimper* 1472. "In vallis Mai-Mezanno rupibus frutices humiliores scandens", 21 Sept. 1840, *Schimper* 1440. Abyssinia, 1862, *Petit* 622. "Ex Tigre versus Begemder", 1863–8, *Schimper* 450.

UGANDA. Masaka District. Makole, 21 Apr. 1935, *A. S. Thomas* 1262 :—occasional climber to 6 dm., flowers pale greenish pink. Karamoja District. Lochoi, 1200 m., 24 May 1940, *A. S. Thomas* 3536 :—a common herb ; root edible, eaten raw ; flowers flushed pink.

KENYA. Vanga, Nov. 1929, *Graham in Kenya For. Herb.* no. 2225 :—small, very thin stemmed climber on grass or low bush ; flowers $\frac{1}{2}$ inch, bright mauve with darker purple markings on the standard ; an irregular light green band along the middle of the leaflets ; pods flattish, 9×1.3 cm. Mida, *Graham in Kenya For. Herb.* no. 1952 :—small climber on bush near forest edges ; flowers pink or mauve pink, pods 8 cm.

TANGANYIKA. Mwanza, 16 Apr. 1926, *Davis* 113. Morogoro, 510 m., 1935, *Rounce* 435. Mafia Island, Kanga, not very common in *Dactyloctenium*, *Pennisetum ciliare* grasses in abandoned road on the margins of coconut plantations, ca. 4.5 m., 14 Aug. 1937, *Greenway* 5101 :—a perennial procumbent herb with small pink flowers and flat pods. Mafia Island, Baleni, rare in *Phyllanthus*, *Maprounea africana*, *Strychnos spinosa*

closed bush on a grey sandy soil, ca. 9 m., 2 Sept. 1937, *Greenway* 5210 :—a climbing herb with small pink flowers and flat curved pods.

ZANZIBAR. Pemba, *J. H. Vaughan* 422. Zanzibar, 1931, *J. H. Vaughan* 1084.

PORTUGUESE EAST AFRICA. Chiloane, 12 Aug. 1887, comm. *L. Scott*. Quelimane District. Mocuba, Namagoa estate, not common, among grass and undergrowth close to streams, Aug. 1946, *Faulkner* P 119 :—flowers pale rose-pink.

SOUTHERN RHODESIA. Odzi, 1050 m. *Eyles* 8603 :—climber on edge of water furrow ; flower bright pink. (A subglabrous form with narrow leaflets).

ANGOLA. Pungo Andongo, sparingly, in damp forests near Candumba, in company with *Oxytenanthera abyssinica* Munro, fl. and ripe fr. end of March 1857, *Welwitsch* 2207 (type of *D. andongensis* Welw. ex Baker).

NATAL. Near Durban, 25 May 1883, *J. M. Wood* 3185 :—purple.

Not uncommon in many parts of India, Ceylon and Burma.

[The Transvaal specimens, *Bolus* 11019, 11840, *Galpin* 753, *Kirk* 93a, *Rogers* 23856 and *Wilms* 412, cited by Burt Davy, *Man. Fl. Pl. & Ferns Transv.*, 423, differ from *D. falcatus* in several respects and must be considered distinct. *J. M. Wood* 565 from Inanda, Natal, is a form of *D. formosus* A. Rich.].

There appears to be no reason for maintaining the supposed distinction between the Indian *D. falcatus* Klein ex Willd. and the African *D. debilis* Hochst. ex A. Rich. The Schimper (type) material of *D. debilis* from Abyssinia represents a somewhat tenuous, small-flowered form of the species, but *D. falcatus* exhibits a wide range of variation in general robustness, leaflet size and indumentum, flower size and colour, and forms just as slender as type *D. debilis* occur in India and Ceylon.

D. andongensis Welw. ex Baker is scarcely more than a sub-glabrous state of *D. falcatus*—the statement in *Fl. Trop. Afr.* 2, 213 (repeated in *Cat. Welw. Afr. P.* 1, 264) that *D. andongensis* is "quite glabrous" requires qualification : the young leaflets of the Kew specimen are distinctly strigillose, and scattered hairs occur along the midribs of some of the older leaflets. Weak forms of *D. formosus* A. Rich. are easily confused with *D. falcatus*, though typical specimens are quite distinct. The former species is nearly always more robust, with larger and more abundant flowers and denser indumentum (the stems of *D. formosus* are frequently clothed with closely adpressed silky hairs ; those of *D. falcatus* are either glabrous or with a thin covering of scattered, patent or slightly reflexed hairs). The stipules of the two species also differ, those of *D. formosus* being short, broad, obtuse, or bluntly pointed, and 9 or more nerved, while those of *D. falcatus* are longly acuminate, sharp-pointed and 5–7 nerved.

A. H. G. Alston remarks (*Year-Book, Dept. of Agr., Ceylon* (1927) 33) that the leaflets of *D. falcatus* frequently have "a light coloured marking down the middle" ; it is interesting to note that the leaflets of at least one African specimen (Kenya, *R. M. Graham*, 2225) are said to be similarly marked.

R. D. MEIKLE.

Neorautanenia pseudopachyrrhiza (Harms) Milne-Redhead, comb. nov.

[*Pachyrrhizus angulatus* (non Rich.).—Bak. in Oliv., Fl. Trop. Afr. **2**, 208 (1871), pro parte, quoad spec. ex Barter, Petherick et Schimper.]

Dolichos pseudopachyrrhizus Harms in Engl., Bot. Jahrb. **26**, 320 (1899).

C. A. Smith (in Burt Davy, Man. Fl. Pl. & Ferns Transv. 416 : 1932) treats *Dolichos* §*Pseudopachyrrhizus* Harms as a genus distinct from *Dolichos*, a view which I wholeheartedly support. The genus *Neorautanenia* Schinz., made to contain a single species from S.W. Africa, was already available, and Smith published several combinations with Schinz's generic name. The species on which Harms based his Section *Pseudopachyrrhizus* has, however, hitherto remained in *Dolichos*. As the name is required for publication in a revised "Flora of the Sudan" now in course of preparation, the necessary combination is here made.

E. MILNE-REDHEAD.

Eriosema Burkei Benth. in Harv. & Sond., Fl. Cap. **2**, 260 (1862).

Eriosema leucanthum Welw. ex Bak. f. in Journ. Bot. **33**, 234 (1895).

E. G. Baker in his "Revision of the African Species of *Eriosema*" (Journ. Bot. **33**, 97 et seq. : 1895) places *E. burkei* in a group "B" having "caules erecti vel suberecti plus minusve virgati" whilst *E. leucanthum* appears much farther on in his classification in group "I" having "caules (saepe herbacei) prostrati vel adscendens rarius erecti". As the stems of both plants are erect, they would fall into either group "B" or "I". The only other character given by Baker that distinguishes these groups is that "B" has woody rootstocks not known by him to be napiform whilst "I" has a tuberous napiform rootstock. *E. burkei* has a rootstock which in young plants is both napiform and woody and which in age enlarges, tending to lose its napiform shape, and would be described merely as woody. It is clear, therefore, that there is no justification for placing *E. leucanthum* and *E. burkei* so far apart.

In his "Leguminosae of Tropical Africa" (1929), the same author places *E. leucanthum* next to *E. burkei* in his Series VII and separates them on whether the leaflets are oblong, elliptic-oblong, elliptic or oblong-oblancheolate in *E. burkei* or linear to linear-oblong in *E. leucanthum*, characters which the abundant material now available shows to be variable and of no specific diagnostic importance.

In floral characters a good deal of variation in the width of the standard is evident, yet I feel that there can be little doubt that these two specific names represent but a single species. There is now at Kew a fine series of specimens showing that *E. burkei* is widely spread in southern Africa. It has long been recognized as occurring in Southern and Northern Rhodesia, and it is common in the *Brachystegia* woodlands of the Solwezi and Mwinilunga Districts not far from the Belgian Congo border (see map, p. 359). Yet Staner and De Craene omit mention of *E. burkei* occurring in the Congo. This omission is explained by their recognizing *E. leucanthum* and citing three gatherings under that name from Katanga.

E. MILNE-REDHEAD.

Eriosema cryptanthum Milne-Redhead, sp. nov., foliis unifoliolatis pellucide punctatis racemos omnino tegentibus, floribus minimis ab omnibus congeneribus perdistincta.

Herba perennis, 5–7 cm. alta, radice tuberosa plus minusve napiformi circiter 1.5 cm. longa et 1 cm. diametro instructa. *Caulis* unicus, simplex, erectus, foliosus, compressus, angulatus, anfractuosus, internodiis 2–8 mm. longis, angulis retrorsim crispule hirsutis. *Stipulae* lanceolatae, superne attenuatae, apice acutae, usque 6 mm. longae, 1.5 mm. latae, glabrae, erectae, persistentes. *Folia* 7–10, unifoliolata, breviter petiolata, superiora racemos omnino tegentia; lamina elliptica, ovata vel obovata, apice obtusa, acuta vel apiculata, basi late cuneata, rotundata vel subcordata, 13–40 mm. longa, 7–23 mm. lata, utrinque glabra, dense pellucide glanduloso-punctata; petioli 1.5–2.5 mm. longi, parce crispule hirsuti; nervi laterales 4–5-jugi, supra inconspicui, subtus prominuli. *Racemi* 1–4, ex axillis foliorum superiorum orti, 7–8 mm. longi, multiflori, densiflori, pedunculo 5–10 mm. longo breviter retrorsim hirsuto instructi; bracteae reflexae, ovato-lanceolatae, apice attenuatae, 1.7–2.5 mm. longae et circiter 0.6 mm. latae, margine sparse ciliatae, persistentes; pedicilli 0.5–1.0 mm. longi, breviter hirsuti. *Calyx* circiter 2 mm. longus, sparse brevissime ciliatus, glaber, glandulosus, subaequaliter lobatus, lobis circiter 0.5 mm. longis deltoideis. *Vexillum* obovatum, superne plus minusve oblongum, valde complanatum, apice emarginatum, basi in unguem cucullatum productum, circiter 4.5 mm. longum, 3 mm. latum; alae oblique oblongae, longe unguiculatae, in toto circiter 5 mm. longae, glandulosae; carina oblique ovata, longe unguiculata, in toto circiter 5 mm. longa, glandulosa. *Stamina* circiter 4 mm. longa; antherae minutae, circiter 0.2 mm. diametro. *Ovarium* sessile, antice longe albo-hirsutum, postice glabrescens. *Legumen* valde compressum, breviter ellipticum, circiter 6 mm. longum et 4.5 mm. latum, parce longe hirsutum. *Semina* 2 mm. longa, 1.6 mm. lata, leviter compressa, brunnea, hilo stramineo conspicuo instructa (Fig. 4).



Fig. 4, calyx and petals of *E. cryptanthum* Milne-Redhead.

NORTHERN RHODESIA. Mwinilunga District. About 0.8 Km. S. of Matonchi Farm, among grass in *Brachystegia* woodland, 14 Febr. 1938, Milne-Redhead 4577 :—perennial with ovoid or spherical tuber and single stem; leaves green, completely hiding the inflorescence; calyx green; standard yellowish green.

E. cryptanthum stands alone in the subgenus *Eueriosema* Staner et De Craene in having its flowers and fruits completely hidden from view by its leaves, and in its leaves being closely beset with pellucid glands.

The flowers are unusually small for the genus, and are rendered very inconspicuous by the absence of a normally developed standard. In *E. cryptanthum* the standard is narrowed in the upper half, which remains folded over the wing and keel petals when the flower is fully developed. Nectaries are absent, so that it would seem unlikely that the plant relies on insect visitors to effect its pollination. Rather would it appear that the flowers are cleistogamous, but direct evidence of this is, unfortunately, lacking.

The nature of the glands is probably unique in *Eriosema*, in that they are set within the mesophyll of the leaf, each gland showing above the epidermis of both the upper and lower surface and forming a direct channel for transmitted light. The leaves of a few of the specimens examined were softened in hot water so that the hidden inflorescences could be examined. On drying these specimens the glands in the leaves assumed a quite different appearance. The liquid had expanded and formed a minute bubble at each end of the gland, and these bubbles were opaque and sulphur coloured, so that both surfaces of the leaves now appeared beset with numerous sulphur dots, and the leaves had become opaque to transmitted light.

Growing in the rich herbaceous vegetation of the *Brachystegia* woodland at Matonchi Farm, *E. cryptanthum* is an exceedingly inconspicuous plant which may well be more frequent than this single gathering suggests. Had I not been collecting some other plant alongside it, it is doubtful whether I should ever have noticed the plant and discovered it to be in flower and fruit.

E. MILNE-REDHEAD.

Eriosema velutinum Bak. f. et Haydon in Bak. f., Leg. Trop. Afr. 510 (1929), (Fig. 5).

UBANGI. Yalinga, 1923-24, *Le Testu* 4793. Near R. Zimbala, 50 Km. N. of Bambari, in a herbaceous marsh, 26 June 1923, *Tisserant* 1146 :—stems single, 1.5 m. high ; flowers yellow.

UGANDA. Entebbe, 1909, *Fyffe* 91.

TANGANYIKA. Kahama District. About 64 Km. S. of Nungwe, Emin Pasha Gulf, in *Brachystegia*—*Isobertinia* woodland, 12 Dec. 1936, *M. L. Morgan* 62 (B.M.) :—straggly plant, c. 6 dm. ; flowers yellow. Kigoma District. S. Muhambwe, 1926, *C. H. B. Grant* s.n. (B.M.). Ufipa District. Namanyere, Kouongo, 6 Dec. 1921, *Swynnerton* 21 (type in B.M.).

NORTHERN RHODESIA. Mwinilunga District. Source-of-Matonchi Dambo, in seasonally wet ground on sand, forming clumps in grassland, 16 Febr. 1938, *Milne-Redhead* 4606 :—perennial with arching shoots ; stems yellowish, much flattened and twisted ; leaves dull green, grey-green below with yellowish midrib ; plants not yet in flower.

ANGOLA. Moxico District. Near Ikula Hot Springs by R. Zambezi, in boggy grassland, 17 Jan. 1938, *Milne-Redhead* 4179 :—herb with rather branched pale brownish stems, flattened especially above ; leaves dull



Fig. 5, calyx and petals of *Eriosema velutinum* Bak. f. et Haydon, all $\times 4$.

green, grey below ; one plant flowering out of season ; calyx pale green ; standard yellow ; other petals whitish.

This most distinct species has a much wider distribution than was indicated by the three East African gatherings cited by its authors. It has been found by Le Testu at Yalinga in Ubangi and by myself in the Mwinilunga District of Northern Rhodesia and in the adjacent part of the Moxico District of Angola. According to Staner & De Craene, the species was not known from the Belgian Congo when they published their revision of the Congo species of *Eriosema* in 1934 (Ann. Mus. Cong. Belg. Bot. sér. 6, **1**, 37–92). In *Eriosema velutinum* it would appear that we have an almost perfect example of the type of distribution which I describe as circum-Congo. Of the eight available gatherings, five of them are from separate territories all of which surround the Congo Basin (see map, p. 359). This circum-Congo distribution is responsible for a striking floristic similarity between parts of Uganda and the Mwinilunga District of Northern Rhodesia.

In Northern Rhodesia and Angola *E. velutinum* is a plant of seasonally wet grasslands on sand where it forms conspicuous clumps with arching yellowish branched stems. The contradictory terms used by Baker & Haydon—"caulis erectus prostratus"—fail to give a correct idea of the habit. The short, dense, almost sessile racemes are themselves racemously arranged on the branches of the inflorescence. But quite the most unusual character of *E. velutinum*, and one which the authors omitted to mention, is the strongly flattened almost ribbon-like upper parts of the stems and the branches of the inflorescence and, as Tisserant (Bull. Mus. Nat. Hist. Nat. Par., sér. 2, **2**, 323 : 1930) points out, the fact that the ultimate branches of the inflorescence are held horizontally and that the racemes are brought into the vertical by the remarkable twisting of these flattened internodes, alternately to the right and the left, giving the inflorescence a unilateral appearance. Another character worthy of mention is the frequent occurrence of leaves with four leaflets.

E. MILNE-REDHEAD.

Fig. 6. Distributions of *Eriosema andohii*, *E. burkei*, *E. molle* and *E. velutinum*.

Eriosema molle [Hutch ex] Milne-Redhead, sp. nov. ; affinis *E. velutino* Bak. f. et Haydon, sed foliis multo minoribus, caulibus erectis haud arcuatis superne plus minusve teretibus haud valde compressis et tortilibus, calycibus minoribus, leguminibus et seminibus majoribus differt.

Herba erecta, usque 12 dm. alta. *Caules* pauci, graciles, leviter lignosi, breviter velutini, demum basin versus glabri, plus minusve sulcati, superne leviter ramosi, densiuscule foliosi. *Stipulae* ovato-lanceolatae, acutae, circiter 3 mm. longae, extra breviter pilosae, intus glabrae. *Folia* digitatim quinquefoliata vel interdum trifoliata, subsessiles vel brevissime petiolata ; petioli usque 2 mm. longi, velutini ; foliola oblanceolata, apice rotundata vel acutiuscula, basi in petiolulum usque 3 mm. longum attenuata, usque 22 mm. longa et 7 mm. lata, lateralia aliquanto minora, supra leviter et brevissime velutina, subtus pilis adpressis griseis densissime sericea et sparsissime minuteque flavo-glandulosa ; costa et nervi laterales supra inconspicui, subtus prominuli dense fulvo-velutini ; nervi laterales 7-9-jugi. *Racemi* axillares, folia plus minusve aequantes vel breviores, circiter 20-flori, velutini ; pedunculi circiter 3 mm. longi, velutini ; bracteae ovatae, acutae, circiter 1.5 mm. longae, velutinae, mox deciduae ; pedicelli usque 1 mm. longi, velutini. *Calyx* circiter 4 mm. longus, subaequaliter lobatus, extra parce velutinus et parcissime flavo-glandulosus, intus puberulus, lobis vix 2 mm. longis deltoideis acutis. *Vexillum* obovatum, breviter unguiculatum, apice emarginatum, basin versus biauriculatum, 9 mm. longum, 7 mm. latum, appendicibus nectariferis haud instructum, extra apicem versus parce pilosum glandulosumque, intus glabrum ; alae oblique obovato-oblongae, longe



Fig. 7, calyx and petals of *Eriosema molle* Hutch. ex Milne-Redhead, all $\times 4$.

unguiculatae, circiter 9 mm. longae, 3 mm. latae, glabrae ; carina oblique obovato-oblonga, obtusa, longe unguiculata, circiter 9 mm. longa, 3 mm. lata, apicem versus flavo-glandulosa. *Stamina* circiter 9 mm.

longa ; antherae minutae, circiter 0.2 mm. diametro. *Ovarium* sessile, dense longeque albo-hirsutum ; stylus inferne parce hirsutus, superne glaber. *Legumen* valde compressum, breviter ellipticum, circiter 14 mm. longum et 9 mm. latum, extra longe fulvido-hirsutum. *Semina* 5 mm. longa, 3-3.5 mm. lata, compressa, castanea, hilo conspicuo instructa. (Fig. 00).

IVORY COAST. Between Yeboué and Blangouakro in the region of Bonaké, 1937, *Scaëtta* 3068.

GOLD COAST. Accra District. Achimota, in grassland with *E. glomeratum*, 29 Aug. 1941, *Milne-Redhead* 5124 :—erect herb, 9-12 dm. ; stems few, slender, woody ; leaflets 3-5, sessile ; flowers pale dull yellow ; fruits brown. Akwapim District. Shai Hills [in the plains SE. of the Akwapim Hills], gregariously frequent in savannah, April, *Irvine* 1429 (type) :—erect herb 9-12 dm. high, multistemmed and shrubby ; branches almost vertical ; flowers golden yellow ; pods becoming brown when ripe. Volta River District. Anum, Krepi, 20 Jan. 1900, *W. H. Johnson* 567 :—plant 12 dm. ; flowers yellow. Kwahu District. Sesiamang, 27 Febr. 1930, *A. S. Thomas* D137 :—erect, 15 dm. high ; flowers butter yellow.

This distinct species has been overlooked for many years, for there is a specimen at Kew (*Johnson* 567) which was collected in 1900. Both this and a subsequent collection (*Thomas* D137) have been referred to *E. cajanioides* (Guill. et Perr.) Hook. f., under which name it was placed in the Flora of West Tropical Africa. The third gathering of *E. molle* to reach the Kew Herbarium (*Irvine* 1429) was recognized by Hutchinson as an undescribed species, but he did not publish a description. When stationed at Achimota during the last war, I noticed the plant growing at one locality in the grasslands near the College, and found that that it would not run down to any of the species in the Flora of West Tropical Africa. Fragments which I pressed in a book and brought home, agreed well with *Irvine's* specimens. Further search in the West African covers of *Eriosema* at Kew revealed the two first mentioned specimens mixed with specimens of *E. andohii* in the covers of what is now called *E. psoraleoides*. Subsequently a specimen of *E. molle* has been received from the Muséum Nationale d'Histoire Naturelle, Paris, collected by *Scaëtta* in the Ivory Coast.

E. molle is undoubtedly related to *E. velutinum* on the one hand and to *E. andohii* [see below] on the other, forming a connecting link between these two species, both of which share with it the digitate arrangement of the leaflets so uncommon in the genus. The upright habit and small leaves distinguish it at once from *E. velutinum* whilst the quinquefoliolate leaves and smaller flowers with acute calyx lobes serve to separate it from *E. andohii*.

E. MILNE-REDHEAD.

Eriosema andohii *Milne-Redhead*, sp. nov., ab *E. psoraleoidi* (Lam.) G. Don foliis digitatim trifoliolatis subtus argenteo-sericeis supra glabris, inflorescentiis quam folia vix longioribus, et ab *E. molli* Hutch. ex M.-R. foliis trifoliolatis subtus haud fuscis supra glabris, floribus majoribus dentibus calycis obtusiusculis differt.

[*Eriosema cajanoides* (non Hook. f.).—Hutch. & Dalz., Fl. W. Trop. Afr. 1, 403 (1928), pro minore parte.].

E. psoraloides (Lam.) G. Don var. *argenteum* Bak. f., Leg. Trop. Afr. 508 (1929), pro parte, excl. spec. Caille (*Chevalier* no. 14632).

Herba erecta, usque 18 dm. alta. *Caules* leviter lignosi, velutini, demum basin versus glabri, plus minusve sulcati, superne leviter ramosi, densiuscule foliosi. *Stipulae* lanceolatae, acutae, circiter 4 mm. longae, extra pilosae, intus glabrae. *Folia* digitatim trifoliolata, subsessilia vel breviter petiolata; petioli usque 3 mm. longi, velutini; foliola oblanceolata, apice rotundata vel acutiuscula, basi in petiolulum usque 2.5 mm. longum attenuata, usque 4.0 cm. longa et 1.2 cm. lata, lateralalia aliquanto minora, supra glabra sed costa inconspicue adpresse sericea, subtus argenteo-sericea; nervi laterales 8–14-jugi. *Racemi* axillares, folia plus minusve aequantes vel iis leviter longiores, 15–25-flori, velutini; pedunculi 2–4 mm. longi, velutini; bracteae lanceolatae, attenuatae, circiter 4 mm. longae, velutinae, mox deciduae; pedicelli circiter 1 mm. longi, velutini. *Calyx* circiter 4 mm. longus, subaequaliter lobatus, extra parce velutinus et parcissime flavo-glandulosus, intus puberulus vel glabrescens, lobis circiter 1 mm. longis ovatis obtusiusculis. *Vexillum* obovatum, breviter unguiculatum, apice emarginatum, basin versus biauriculatum, usque 13 mm. longum et 8.5 mm. latum, appendicibus nectariferis haud instructum, extra apicem et medium versus parce breviter pilosum et flavo-glandulosum, intus glabrum; alae oblique oblongae, longe unguiculatae, circiter 12 mm. longae et 3 mm. latae, parcissime flavo-glandulosae; carina oblique obovato-oblonga, obtusa, longe unguiculata, circiter 12.5 mm. longa et 4 mm. lata, apicem versus flavo-glandulosa. *Stamina* circiter 13 mm. longa; antherae circiter 0.5 mm. diametro. *Ovarium* sessile, circiter 3 mm. longum, dense longe albo-hirsutum; stylus circiter 10 mm. longus, inferne parce adpresse hirsutus,



Fig. 8, calyx and petals of *Eriosema andohii* Milne-Redhead, all $\times 4$.

superne glaber. *Legumen* valde compressum, breviter ellipticum, circiter 14 mm. longum et 10 mm. latum, extra longe fulvido-hirsutum. *Semina* 5.5 mm. longa, 3.5–4 mm. lata, pallide brunnea castaneo-marmorata, hilo ochraceo conspicuo instructa.

GOLD COAST. Ho District. Alavanyo, gregarious, frequent at edge of swampy patches in lowland savannah in open, 180–240 m., 24 Sept. 1934, *St. Clair-Thompson* 1438 :—erect herb to 12 dm., multistemmed and shrubby ; flowers yellow ; native name *mase ewe*. ? Kwahu District. Afram Plains, Jan. 1928, *Irvine* 620 :—woody herb, 12–18 dm. high ; backs of leaves covered with white hairs ; flowers yellow. Mampong District. Near Ejura, in savannah forest, 270 m., Nov. 1934, *Vigne in For. Herb.* 3465 :—herb 6–12 dm. high ; flowers yellow. Kintampo District. Kintampo, 20 Mar. 1920, *Dalziel* 14. W. Gonja District. Damongo, common in places in savannah forest, July 1943, *Andoh in For. Herb.* 5191 (type) :—erect shrub, 15 m. high, with silky leaves in threes ; flowers ornamental, bright yellow. Wa District. Kulpawn Channel between Kullum and Katua, 26 Apr. 1927, *Kitson* 829 (K., B.M.). Northern Territories. Without locality, 1922, *N. C. McLeod* 819. With locality, 1916, *Kitson* s.n. (B.M.).

Whilst undoubtedly allied to *E. psoraleoides* (Lam.) G. Don, this species is quite easily distinguished from it. The seven specimens which are here cited agree well with each other. An untypical and possibly damaged shoot on Dalziel's specimen shows leaves up to 5.5 cm. long and inflorescences up to 11 cm., but it is accompanied on the same sheet by a normal specimen. The type specimen is in flowering state, so the description of the fruits has been taken from another gathering, namely from *Kitson* 829.

The *nomen nudum*, *E. argenteum* A. Chev., was applied to a specimen in Chevalier's herbarium, no. 14632, collected by Caille in French Guinea. This gathering is represented at Kew by a shoot of a plant which I would hesitate to place under *E. andohii* although it does possess certain features in common with it. Caille's plant has a sparsely villous upper surface of the very pointed leaflets and an inflorescence thrice exceeding the leaves. Until more and better material of this plant is available, I prefer to leave it undetermined.

E. G. Baker, however, made it a variety of *E. psoraleoides* in his *Leguminosae of Tropical Africa*, 508 (1929), validating the epithet with this short phrase in English—"a variety of the above with narrow leaflets, silvery below". He cites Caille's specimen and adds the "Gold Coast", meaning to refer to it some of the above cited specimens. To avoid any confusion I have given the Gold Coast specimens a new name. The epithet was chosen in honour of Mr. J. E. Andoh, of the Gold Coast Forest Department, from whose gathering the above description has been drawn up.

There is a striking resemblance between *E. andohii* and *E. molle*, but the latter species is easily separated from it by the characters given in the diagnosis. *E. andohii* thus forms a connecting link between the pinnately trifoliate *E. psoraleoides* and the digitately quinquefoliate *E. molle* and *E. velutinum*. It is strange that two species of this small but natural group should be so strictly limited in their distribution (see map, Fig. 6) and should both occur in the Gold Coast.

E. MILNE-REDHEAD.

Cylicodiscus paucijugus (Harms) Verdcourt, comb. nov.

Piptadenia paucijuga Harms in Engl., Bot. Jahrb. **51**, 368 (1914).

Cylicodiscus battiscombei Bak. f. in Journ. Bot. **67**, 198 (1929).

Although the type of *Piptadenia paucijuga* has not been seen by me and probably does not now exist (*Leopold in Holtz* 3207, from Usaramo, Tanganyika), there can be little doubt that the above synonymy is correct. Both Mr. P. J. Greenway and Mr. J. P. M. Brenan agree that this is so. Harms mentions in his description that the stamens are affixed to a cupuliform disc, a character exhibited by the species of *Cylicodiscus*.

B. VERDCOURT.

Acacia sieberiana DC. var. **villosa** A. Chev. in Bull. Soc. Bot. France **74**, 959 (1928).

[*Acacia rehmanniana* (non Schinz).—Hutch. et Dalz., Fl. W. Trop. Afr., **1**, 360–361 (1927) ; A. Chev. in Rev. Bot. Appl. **8**, 197 (1928) ; Bak. f., Leg. Trop. Afr., 838 (1930), pro parte, quoad syn. *Acacia sieberiana* DC. var. *villosa* A. Chev.].

[*Acacia sieberiana* DC. var. *rehmanniana* (Schinz) Roberty in Candollea **11**, 142 (1948), quoad syn. *A. sieberiana* var. *villosa* A. Chev.].

Acacia sieberiana DC. var. **vermoeseni** (De Wild.) Keay et Brenan, stat. nov.

Acacia vermoeseni De Wild., Pl. Bequaert. **3**, 68 (1925) ; Bak. f., Leg. Trop. Afr. 837 (1930).

Acacia sieberiana DC. var. **woodii** (Burt Davy) Keay et Brenan, stat. nov.

Acacia woodii Burt Davy in Kew Bull. **1922**, 332 (1922) ; Bak. f., Leg. Trop. Afr. 838 (1930) ; Burt Davy, Man. Fl. Pl. & Ferns Transv. 334 (1932).

Examination of specimens shows that the name *Acacia rehmanniana* has been widely misapplied to plants which appear to be only hairy varieties of *A. sieberiana* DC. The true *A. rehmanniana* Schinz (in Bull. Herb. Boiss. **6**, 525 : 1898) was described from the Transvaal, and specimens in the Kew Herbarium show that it ranges northwards through S. Rhodesia as far north as the River Kabompo in N. Rhodesia. It differs obviously from all forms of *A. sieberiana*, especially in the pod which has stiffly coriaceous valves longitudinally wrinkled on the outer surface, and normally dehisces while still on the tree. In addition, the coarse spreading indumentum usually golden on the young parts, the numerous short closely arranged pinnae, the small leaflets, and the inflorescences on usually short peduncles crowded towards the ends of the shoots, give this species a most distinctive appearance. The involucels provide a further useful character, being at or near the base of the peduncle in *A. rehmanniana*, but in the upper half at the peduncle in *A. sieberiana*.

A. sieberiana is a variable species, but in all its forms the pod is thick and woody, lacks the conspicuous wrinkles of *A. rehmanniana*, and dehisces tardily upon the ground.

At least three variants of *A. sieberiana* have densely pubescent young twigs. Chevalier, rightly we consider, described a variant in West Africa as *A. sieberiana* var. *villosa* ; the type-number of this (Chevalier 700, from Ouré, French Sudan) we have examined in the Kew Herbarium. This plant was misidentified with *A. rehmanniana* in the Flora of West Tropical Africa, and subsequent authors, including Chevalier himself, have accepted this view. Roberty rightly regarded this plant as a variety of *A. sieberiana* but made the new combination var. *rehmanniana* (Schinz) Rob., which is illegitimate because var. *villosa* A. Chev. was included as a synonym.

In typical *A. sieberiana* in West Africa the leaflets range in length from 2.5–4.5 mm., while those of var. *villosa* are normally only 2–2.5, very rarely up to 3 mm. It is therefore suggested that the var. *villosa* may have been derived from a small-leafleted form of typical *A. sieberiana*. The measurements here and in the following paragraphs are taken from median leaflets of the pinnae of mature leaves.

In East and South Tropical Africa what we consider to be var. *vermoeseni*, another hairy variant of *A. sieberiana*, occurs. This is very similar to var. *villosa* but differs in the larger leaflets, 3–5.5 (–6) mm. long. Measurements of leaflets of typical East African *A. sieberiana* show a range in length from 2.75–6 mm.—slightly greater than that in the West. It seems as though var. *vermoeseni* may have been derived from a form of the typical plant with comparatively large leaflets. A further tendency in var. *vermoeseni* is for the production of rather larger capitula (var. *vermoeseni* : 10–16 mm. diam. ; var. *villosa* : 6–10 mm. diam. ; measurements taken from pressed specimens). Our interpretation of var. *vermoeseni* is based on a specimen from Northern Rhodesia (Rogers 8570) stated by Dr. J. Hutchinson to have been compared with the type. Var. *vermoeseni* ranges from Southern Rhodesia and Nyasaland through Northern Rhodesia to Tanganyika and the Belgian Congo.

Acacia woodii appears to us to be another variant of *A. sieberiana*, although its author compared it only with *A. rehmanniana* and E. G. Baker did the same. As far as the pod and inflorescence are concerned *A. woodii* differs from *A. rehmanniana* in the same way as typical *A. sieberiana*. It is evident, therefore, that *A. woodii* is much more closely related to *A. sieberiana* than to *A. rehmanniana*, and this is supported by the general appearance of the foliage. *A. woodii* is very different from typical *A. sieberiana* in the copious, coarse, spreading indumentum on the branchlets and rhachides, normally strikingly golden on the young parts when dry ; in this respect only, *A. woodii* resembles *A. rehmanniana*. We consider therefore *A. woodii* to be a variant of *A. sieberiana* with a more extreme development of indumentum than the var. *vermoeseni*. In addition, while typical *A. sieberiana*, together with var. *villosa* and var. *vermoeseni*, has the pods glabrous or almost so, in var. *woodii* the pods are copiously pubescent when young and retain a certain amount of indumentum even when old. In spite of the original description of the pods as glabrous, the very juvenile ones on the type specimen (Medley Wood 3528, from Natal, in Kew Herbarium) are densely pubescent ; and other specimens named by the late Dr. Burt Davy himself have pods in various stages to maturity and

and all more or less pubescent. In leaflet-size var. *woodii* appears to be more variable than the other two varieties. Its geographical area is from Natal and the Transvaal to Northern Rhodesia and Angola.

KEY TO THE VARIETIES OF *A. SIEBERIANA* WITH DENSELY HAIRY SHOOTS.

Indumentum of shoots short and rather downy, usually neither markedly golden nor villous ; fruits glabrous or nearly so, even when young :

Median leaflets of pinnae 2-2.5 mm. long, very rarely to 3 mm. (West African) var. *villosa*

Median leaflets of pinnae 3-6 mm. long (East and Central Africa) var. *vermoeseni*.

Indumentum of shoots much coarser, normally villous and markedly golden especially when young ; fruits densely pubescent when young and slightly so even when old (Southern Africa) var. *woodii*.

R. W. J. KEAY & J. P. M. BRENAN.

LORANTHACEAE

***Loranthus belvisii* DC.**, Prodr. **4**, 303 (1830).

Loranthus lanceolatus P. Beauv., Fl. Owar. & Benin **2**, 8, t. 64 (1810?), non Ruiz et Pav., Fl. Peruv. **3**, 47, t. 278 (1802), *nom illegit.*

Although there is some doubt about the exact date of publication of *Loranthus lanceolatus* P. Beauv., at least it was not before 1808 (see Merrill in Proc. Amer. Philos. Soc. **75**, 918 : 1936), and it is therefore a later homonym. *L. belvisii* DC. was a renaming of *L. lanceolatus* P. Beauv. on account of the prior use of the latter binomial by Ruiz and Pavon ; and *L. belvisii* DC. is to be adopted as the correct name.

The name *L. lanceolatus* P. Beauv. was retained by Sprague in Dyer, Fl. Trop. Afr., **5**, pt. 1, 354-5 (1910) for the reason, now no longer a valid one, that *L. lanceolatus* Ruiz et Pav. is not now considered to be a *Loranthus*. The Flora of West Tropical Africa likewise keeps the illegitimate name, so that the present note seems required.

J. P. M. BRENAN.

RHAMNACEAE

***Lasiodiscus zenkeri* Suessenguth** in Fedde, Rep. Sp. Nov. **50**, 328 (1941).

[*Lasiodiscus mannii* (non Hook. f.)—Hutch et Dalz., Fl. W. Trop. Afr. **1**, 472 (1928), pro parte, quoad spec. Preussii.].

FRENCH CAMEROONS. Yaunde, *Zenker* 695a (type in Berlin Herbarium).

A specimen which is undoubtedly a duplicate of the type gathering is in the Kew Herbarium labelled "*Lasiodiscus mannii* Oliv. Kamerun Preuss 695a". This specimen was cited by Hutchinson & Dalziel under *L. mannii* Hook. f., and being a Preuss specimen, Victoria was suggested as a possible locality. It now seems clear that the specimen was distributed from Berlin with the label incorrectly written, the name Preuss replacing that of Zenker. As the species concerned came from Yaunde in the French Cameroons, the entries " ?Victoria " and " Preuss 695a " under *Lasiodiscus mannii* should be deleted from the Flora.

E. MILNE-REDHEAD.

BURSERACEAE

Commiphora mollis (Oliv.) Engl. in DC., Monogr. Phan. **4**, 23 (1883) ; Engl. in Engl., Bot. Jahrb. **48**, 472 (1912) ; Engl. in Engl. & Prantl, Pflanzenfam., ed. 2, **19a**, 435 (1931) ; Burt Davy, Fl. Transvaal, **2**, 484 (1932) ; B. D. Burt in Kew Bull. **1935**, 108, 111 (1935).

Balsamodendron molle Oliv., Fl. Trop. Afr. **1**, 326 (1868).

Balsamea mollis (Oliv.) Engl. in Engl., Bot. Jahrb. **1**, 42 (1881).

Commiphora welwitschii Engl. in DC., Monogr. Phan. **4**, 22 (1883) ; Engl. in Engl., Bot. Jahrb. **48**, 473 (1912) ; Engl. in Engl. & Prantl, Pflanzenfam., ed. 2, **19a**, 435 (1931).

Commiphora cinerea Engl. in Engl., Bot. Jahrb. **19**, 139 (1894) ; Engl. in Engl., Bot. Jahrb. **48**, 473 (1912) ; Engl. in Engl. & Prantl, Pflanzenfam., ed. 2, **19a**, 435 (1931).

Commiphora stuhlmannii Engl., Pflanzenw. Ost-Afr. **C**, 230 (1895) ; Engl. in Engl., Bot. Jahrb. **48**, 474 (1912) ; Engl. in Engl. & Prantl, Pflanzenfam., ed. 2, **19a**, 435 (1931) ; B. D. Burt in Kew Bull. **1935**, 102, 108, 111 (1935).

Commiphora dekindtiana Engl. in Engl., Bot. Jahrb. **34**, 312 (1904) ; Engl. in Engl., Bot. Jahrb. **48**, 473 (1912) ; Engl. in Engl. & Prantl, Pflanzenfam., ed. 2, **19a**, 435 (1931).

Commiphora heterophylla Engl. in Engl., Bot. Jahrb. **34**, 312 (1904) ; Engl. in Engl., Bot. Jahrb. **48**, 475 (1912) ; Engl. in Engl. & Prantl, Pflanzenfam., ed. 2, **19a**, 435 (1931).

Commiphora montana Engl. in Engl., Bot. Jahrb. **34**, 312 (1904) ; Engl. in Engl., Bot. Jahrb. **48**, 473 (1912) ; Engl. in Engl. & Prantl, Pflanzenfam., ed. 2, **19a**, 435 (1931).

Commiphora krausei Engl. in Engl., Bot. Jahrb. **44**, 152 (1910) ; Engl. in Engl., Bot. Jahrb. **48**, 472 (1912) ; Engl. in Engl. & Prantl, Pflanzenfam., ed. 2, **19a**, 435 (1931) ; B. D. Burt in Kew Bull. **1935**, 102 (1935).

Commiphora boehmii Engl. in Engl., Bot. Jahrb. **48**, 472 (1912) ; Engl. in Engl. & Prantl, Nat. Pflanzenfam., ed. 2, **19a**, 435 (1931) ; B. D. Burt in Kew Bull. **1935**, 102 (1935).

Commiphora ndemfi Engl. in Engl., Bot. Jahrb. **54**, 293 (1917) ; Engl. in Engl. & Prantl, Pflanzenfam., ed. 2, **19a**, 435 (1931) ; B. D. Burt in Kew Bull. **1935**, 108 (1935).

The naming of *Commiphoras* in the neighbourhood of *C. mollis* has usually been on a basis of "hoping for the best". While investigating some *Commiphoras* for Miss I. C. Verdoorn of the Division of Botany and Plant Pathology, Pretoria, South Africa, I wished to find out the limits of the species *C. mollis* (Oliv.) Engl., and the long study of the group in S. and E. Africa which followed convinced me that the above wholesale reductions to synonymy are necessary. A possible further synonym, of which I have not seen authentic material, is *Commiphora iringensis* Engl. in Engl., Bot. Jahrb. **44**, 150 (1910). All sorts of gradations link these so-called species, and while the extremes look different, even here I do not consider the characters specific. If this amalgamation

is adopted *C. mollis* becomes an easily recognised species with a wide but consistent distribution, variable admittedly, but far from excessively so.

The number of leaflets varies from 2–6 pairs, and there is a wide range of size.

C. mollis, in its new sense, has been found in Tanganyika Territory, Portuguese East Africa, Nyasaland, N. and S. Rhodesia, Bechuanaland, Angola, South-west Africa and the Transvaal.

J. P. M. BRENNAN.

OLEACEAE

Jasminum fluminense Vell., Fl. Flumin. 10 (1825) ; op. cit., Atl. **1**, t. 23 (1827).

Jasminum abyssinicum R. Br. in Salt, Voy. Abyssin., App. 63 (1814), *nom. nud.* ; non *J. abyssinicum* Hochst. ex DC. (1844).

Jasminum mauritianum Boj. [Hort. Maurit. 204 (1837), *nom. nud.*] ex DC., Prodr. **8**, 310 (1844) ; Bak. in Dyer, Fl. Trop. Afr. **4**, 1, 10 (1902).

Jasminum bahiense DC., tom. cit. 311 (1844), *nom. illegit.*

[*Jasminum azoricum* (non L.).—Eichl. in Mart., Fl. Brasil. **6**, pars. 1, 315, t. 84, fig. 1 (1868). Urb. Symb. Antill. **8**, 534 (1921). Britton & Wils. in Sci. Surv. Porto Rico & Virgin Is. **6**, 80 (1925).]

This species, which has a wide distribution in tropical Africa and the Mascarene islands, is established in the West Indies as well as on the mainland of tropical America in Brazil. In works on the flora of tropical Africa, where the species is indigenous, the name in general use for it is *J. mauritianum*, based on material from Mauritius. *J. bahiense*, described by De Candolle simultaneously with *J. mauritianum*, is the same species introduced into Brazil. In point of fact the name *J. bahiense* is illegitimate, as De Candolle included under it (as a variety) the earlier *J. fluminense* which Velloso had described from Brazil in 1825. The plate which Velloso subsequently published to illustrate his species shows the corolla-tube too short, but this, as suggested by De Candolle, must have been due to a graphical error as the plate can scarcely represent anything but the species under discussion. Eichler in 1868 treated *J. bahiense* and *J. fluminense* as synonymous, but wrongly referred them to *J. azoricum* L. a species from which the Brazilian plant is very different. Workers on West Indian botany have followed Eichler in using the erroneous name *J. azoricum*. The valid name for this tropical African species established in America is *J. fluminense*.

J. E. DANDY.

ASCLEPIADACEAE

Ceropegia brosim Bruce et Bally, sp. nov. ; quoad habitum scandentem et tuberum corollaeque indolem *C. debili* N.E.Br. affinis, sed foliis longioribus, coronae lobis interioribus linearibus (nec oblanceolatis), corona exteriore majore differt.

Herba scandens, usque 60 cm. alta. *Tuber* depresso-sphaericum, 4–6 cm. diametro, 3 cm. altum. *Caulis* parce ramosus, glaber, teres, basi 2–3 mm. diametro. *Folia* patentia, subsessilia vel breviter petiolata ; lamina linearis, glabra, circiter 3 cm. longa, 3 mm. lata, apice acuta et

apiculata, basi cuneata, nervo medio subtus prominente supra impresso. *Cymae* 5-6-florae, e nodis lateraliter ortae, floribus seriatim expansis ; pedunculus circiter 6 mm. longus ; pedicelli 4 mm. longi. *Calycis* lobi late deltoidei, 1 mm. longi, basi 0.5 mm. lati, glabri, apice acuminati. *Corolla* circiter 2.4 cm. longa ; tubus basi globoso-inflatus, 5 mm. diametro, deinde constrictus et per 10 mm. cylindricus, 2 mm. diametro, intus pilis paucis ornatus, apicem versus infundibuliformis, fauce 5 mm. diametro ; lobi erecti, apice connati, e basi deltoidea late lineares, replicati, 6 mm. longi, basi 2 mm. lati, apice rotundati, pilis purpureis ciliati. *Corona* duplex, glabra ; lobi exteriores basi breviter connati, plus minusve cupuliformes, apicem versus liberi, patuli, poculiformes, 0.75 mm. alti, margine undulato-crenulati ; lobi interiores lineares, erecti, circiter 2.25 mm. longi, primo conniventes, demum apice recurvati.

KENYA COLONY. Kisumu District, Onjiko, about 1140 m., Dec. 1941, *Boy Opiko* (*Bally* S. 83) (type) :—tubers flat compressed discs, eaten raw by natives.

This little climber has pale greenish-white flowers finely spotted with pale purple in the lower part, becoming darker above, with the throat and base of the lobes deep maroon, whilst the tips of the lobes are green with very minute purple dots and ciliate with pale purple hairs.

A specimen found by Mrs. Copley (*Bally* S.93) in Nairobi is probably a form of *C. brosimia*. It is similar to it in habit and in the shape and structure of the corolla, but rather larger. The chief difference is that the outer corona-lobes are larger and distinctly 2-horned. The specific epithet *brosima* (Gk. βρωσιμος), meaning edible, refers to the tubers. Measurements have been taken from spirit material.

E. A. BRUCE & P. R. O. BALLY.

Ceropegia copleyae *Bruce et Bally*, sp. nov. ; quoad structuram coronae et faciem corollae *C. crassifoliae* Schltr. affinis, sed habitu erecto, foliis semiteretibus, floribus minoribus valde distincta.

Herba erecta, carnosa, usque 14 cm. alta. *Caulis* simplex, glaber, carnosus, cylindricus, basi 3-4 mm. diametro, internodiis 5-7 mm. longis. *Folia* suberecta, sessilia, carnosa, glabra, semiteretia, 4-6.5 cm. longa, 4-5 mm. lata, 3 mm. crassa, supra plana nervo medio impresso, subtus convexa nervo medio subprominente, apice subacuta et apiculata, basi cuneata. *Inflorescentiae* ex axillis foliorum pedunculatae, 3-5-florae, floribus seriatim expansis ; pedunculi carnosi, simplices vel ramosi, circiter 1 cm. longi, basi 2 mm. diametro ; pedicelli circiter 6 mm. longi. *Bractae* parvae, deltoideae, vix 1 mm. longae. *Calycis* lobi lanceolati, circiter 2.5 mm. longi, basi 1 mm. lati, apice acuminati. *Corolla* circiter 1.3 cm. longa, extra glabra ; tubus basi subglobosus, 4 mm. diametro, deinde abrupte constrictus et per 5.5 mm. cylindricus, 2 mm. diametro, fauce vix ampliatus, intus parce pubescens ; lobi carnosi, 3.5 mm. longi, basi 2 mm. lati, plus minusve oblongi, apice subacuti, dorso medio longitudinaliter canaliculati, intus superne $\frac{2}{3}$ lamina incrassati, pilis longis setaceis albidis ornati. *Corona* duplex, breviter stipitata ; lobi exteriores poculiformes, poculis fauce 1 mm. latis 1.3 mm. altis apice rotundatis emarginatis ; lobi interiores cum exterioribus alternantes, late lineares, circiter 1 mm. longi, apice rotundati vel paullo dilatati, super antheras subhorizontaliter incumbentes apicibus haud tingentibus.

KENYA COLONY. Kiambu, 15 miles East of Nairobi, in shallow soil in half-shade, about 1800 m., March 1941, *Mrs. Kathleen Armstrong* (Bally S. 44) (type).

This inconspicuous plant is characterized by its unusual leaves, which are comparable to those of some species of *Mesembryanthemum*. The flowers are small and uniformly green in colour, so that the species is easily overlooked. The plant was originally discovered by Mrs. Copley growing in her garden at Nairobi but was not fully developed. Later the following year mature plants were found by Mrs. Armstrong at Kiambu, and it is from these that the above description has been drawn up, the measurements being made from spirit material.

E. A. BRUCE & P. R. O. BALLY.

***Ceropegia evelynae* Bruce et Bally, sp. nov.** ; affinis *C. succulentae* E. A. Bruce, sed corollae lobis longioribus superne multo angustioribus structuram asymmetrico-curvatam apertam efformantibus, tubo basi obovoideo-inflato, foliis anguste oblongo-ellipticis differt.

Herba perennis, scandens, circiter 2 m. alta, radicibus fibrosis. *Caulis* carnosus, simplex vel sparse ramosus, glaber, basi teres, circiter 7 mm. diametro, internodiis 12–24 cm. longis. *Folia* glabra, patentia, petiolata ; petioli circiter 8* (12) mm. longi, supra canaliculati ; lamina carnosa, anguste oblongo-elliptica, circiter 5* (8) cm. lata, 1.6* (3.3) cm. lata, apice subacuta, basi cuneata, subtus nervo medio prominente et carinato, nervis lateralibus indistinctis. *Inflorescentiae* ex axillis foliorum 4–6 cm. pedunculatae, 2–3-florae, floribus seriatim expansis ; pedicelli 1–1.5 cm. longi. *Calycis* lobi plus minusve lineares, circiter 5* (7) mm. longi, glabri, apice leviter recurvati. *Corolla* circiter 5* (6) cm. longi ; tubus basi per 1.4 cm. obovoideo-inflatus et infra apicem 1.2 cm. diametro, deinde abrupte constrictus et per 1 cm. cylindricum, 4 mm. diametro, apicem versus dilatatus et per 1.4 cm. infundibuliformis, fauce 1.6 cm. diametro, extra glaber, intus infra constrictionem setis retrorsis instructus ; lobi in structuram asymmetrico-curvatam apice cohaerentes, e basi deltoidea lineares, replicati, 2.5 cm. longi, basi 1 cm. lati, marginibus triente superiore aperte replicatis, inferius omnino complanato-replicatis, margine pilis albidis et purpureis ciliati. *Corona* duplex ; lobi exteriores basi in cupulam circiter 2 mm. altam fauce 3.5 mm. diametro extra parce hispidam intus glabram connati, lobis apice bicornutis, cornubus loborum adjacentium approximatis linearibus recurvo-patentibus hispidis circiter 1 mm. longis ; lobi interiores clavati, erecto-conniventes, circiter 2.2 mm. longi, apice subtruncati, 1 mm. lati, basi 0.5 mm. lati, glabri.

UGANDA. Toro District, Fort Portal, Kilcloony Crater Lake, about 1500 m., scrambling in undergrowth at the water's edge, July 1944, *Mrs. E. Forbes* 65 (Bally S. 158) (type) :—corolla with a greenish white bulbous base, expanded part white with purple spots, lobes bright almond green at the base shading to yellow and becoming purplish maroon at the tips.

This attractive fleshy climber with its dark shiny green leaves and large flowers is named in honour of Mrs. Evelyn Forbes, the collector.

*These measurements refer to dried material, the measurements in brackets are taken from spirit material.

A part of the gathering from which the original dried specimen was made, has been cultivated in Nairobi by one of us (P.R.O.B.), and it is from this plant that the measurements of the spirit material have been obtained.

C. evelynae is very near *C. succulenta* E. A. Bruce, but differs mainly in the longer and narrower corolla lobes, which are bent over at the top, and in the leaves which are narrower and tapered to the base and apex. A plant collected by Dr. van Someren in the Emali Hills, near Kibwezi, Kenya Colony (*Bally* S.70) is very similar to *C. evelynae* in the form of the corolla, but approaches *C. succulenta* in the leaf shape. The coronal structure is midway between the two species. It is therefore possible that the plant may be a hybrid between *C. evelynae* and *C. succulenta*.

E. A. BRUCE & P. R. O. BALLY.

Ceropegia helicoides Bruce et Bally, sp. nov. ; quoad habitum scandentem et folia plus minusve carnosa florumque indolem, *C. evelynae* Bruce et Bally affinis, sed corollae lobis elongatis tortuosis, calycis lobis longissimis valde distincta.

Herba perennis, scandens, usque 2 m. alta, radicibus fibrosis. *Caulis* carnosus, glaber, teres. *Folia* plus minus carnosa, breviter petiolata ; petioli circiter 1 cm. longi ; lamina oblongo-ovata, circiter 8.4 cm. longa, 4.6 cm. lata, apice subrotundata et apiculata, basi rotundata, nervo medio subtus prominente supra impresso, nervis lateralibus utrinsecus 7, margine parce ciliata. *Inflorescentiae* exaxillis foliorum 1-3-florae, floribus seriatim expansis ; pedicelli 1.5-3 cm. longi. *Calycis* lobi lineari-subulati, patuli, 2-2.9 cm. longi, basi 2.2-3.1 mm. lati, margine ciliati, corollae basin inflatam paullo superantes. *Corolla* circiter 9.8 cm. longa ; tubus basi per 1.35 cm. inflato-orchiformis 1 cm. diametro, deinde abrupte constrictus et leviter depressus, per 5 mm. cylindricus et 4 mm. diametro, apicem versus per 1.4 cm. dilatato-infundibuliformis et fauce 1.2 cm. diametro ; lobi e basi deltoidea sensim angustati, 6.4 cm. longi, replicati, sinibus interioribus per 3 cm. continuis pocula elongata tenuiter pilosa efformantibus, superne per 3.4 cm. liberi, tortuosi, margine pilis pallido-purpureis ciliati. *Corona* duplex, glaber ; lobi exteriores basi in cupulam 1.5 mm. altam connati, lobis apice bicornutis, cornubus lineari-subulatis erectis circiter 1.5 mm. longis superne per paria propria contiguis ; lobi interiores lineares, erecto-conniventes, circiter 4 mm. longi, apice rotundati.

KENYA COLONY. Northern Frontier Province. Matthew's Range, Febr. 1945, *Mrs. Joy Adamson* (*Bally* S. 153) (type).

This is a fleshy climber similar in habit to *C. succulenta* E. A. Bruce. The large elongate flowers have a pale greenish-white corolla tube marked with small maroon spots, the lobes are pale green at the base becoming white and are finely dotted with maroon, the spirally twisted tips are deep purple-maroon.

A specimen collected in Mtuwambu, Tanganyika, appears to be intermediate between this species and *C. evelynae* Bruce and Bally, having the spiral lobes and long sepals of *C. helicoides* but the funnel-shaped tube and rounded inflation of *C. evelynae*.

Measurements in the description have been taken from spirit material.

E. A. BRUCE & P. R. O. BALLY.

Ceropegia imbricata Bruce et Bally, sp. nov. ; affinis *C. vignaldianae* A. Rich., sed foliis ovatis carnosius differt.

Herba erecta, 8–10 cm. alta, radice tuberosa. *Caulis* simplex, teres, glaber, basi 2 mm. diametro, internodiis 7–14 mm. *Folia* suberecta, glabra, carnosia, petiolata, petiolis circiter 3 mm. longis superioribus minoribus ; lamina ovata, 1–2.3 cm. longa, 0.5–1.2 cm. lata, 1.5–2 mm. crassa, supra concava, subtus subconvexa, apice acuminata basi rotundata vel cuneata, margine et supra pilis papillosis albidis paucissimis ornata, nervis indistinctis. *Inflorescentiae* 1–2-florae, e nodis lateraliter ortae ; pedunculus circiter 2 mm. longus ; pedicelli 2.5–4 mm. longi. *Calycis* lobi lanceolati, circiter 2 mm. longi, basi 0.75 mm. lati, apice acuminati et recurvati. *Corolla* circiter 1.7 cm. longa ; tubus basi inflato-globosus 5 mm. diametro, intus minute et parce verrucosus, deinde per 7 mm. abrupte constrictus anguste cylindricus et 2 mm. diametro, infra apicem ampliatus fauce 5 mm. diametro ; lobi replicati, erecti, apice connati, late lineares, 5 mm. longi, apice rotundati, margine pilis longis purpureis ciliati, ceterum glabri. *Corona* duplex, glabra, lobi interiores 1.4 mm. lati ; basi in cupulam brevem 1 mm. altam fauce 3 mm. diametro margine undulatam connati ; lobi interiores erecto-conniventes, subulati, 2.3 mm. longi, apice paullum recurvo-patentes.

KENYA COLONY. Nairobi, growing in shallow black cotton soil, 5 July 1940, Mrs. Copley (Bally S. 48) (type).

This attractive little plant has rather closely set, over-lapping, dark green leaves and greenish-white flowers with maroon tips. The available spirit material has immature flowers, so the floral measurements in the description have been made from a photograph of the original plant of which the spirit material is a part. The specific epithet *imbricata* refers to the overlapping leaves.

E. A. BRUCE & P. R. O. BALLY.

RUBIACEAE

Galium scioanum Chiov. in Ann. Bot., Roma **9**, 322 (1911).

ABYSSINIA. Scioa Province. In marshy places near the tomb of Finfinni in Addis Ababa, alt. 2400 m., 8 June 1909, G. Negri 1410 (typus in Herb. Florent.).

KENYA. Central Province, Fort Hall District. Kinangop, alt. 2130 m., Sept, 1934, Mrs. Albrechtsen (Coryndon Museum no. 6717).

TANGANYIKA TERRITORY. Southern Highlands Province. Njombe District. North of the upper Ruhudje R., Lupembe area, May 1931, Schlieben 896. Msima Stock Farm, 1932, Emson 279 :—annual creeper 60 cm. long with white flowers, common in vleis and by riversides. var. **glabrum** Brenan, var. nov. ; planta omnino glabra vel fere glabra nec pubescens.

[*Galium mollugo* (non L.).—K. Schum. in Warb., Kunene-Sambesi Exped. 394 (1903) ; R. Good in Journ. Bot. **65**, suppl. 2, 43 (1927)].

[*Galium spurium* (non L.).—Hutch. et Bruce in Kew Bull. **1941**, 150 (1941)].

ABYSSINIA. Harar Province : Galla Pass, by stream, alt. 2320 m., 24 Febr. 1933, Gillett 5200 :—flowers white.

KENYA. Rift Valley Province. Trans-Nzoia District. Uasin Gishu, damp ground by river, alt. 2130 m., *Miss Harvey* 103 :—herb, semi-prostrate ; flowers white.

TANGANYIKA. Southern Highlands Province. Iringa District. Itheme, in a marshy bottom, alt. 1830 m., 28 Jan. 1934, *Michelmores* 934 :—flowers white.

NORTHERN RHODESIA. Mwinilunga District. R. Lunga just below R. Mudjanyama junction, among grass and herbs in open on river bank, 25 Nov. 1937, *Milne-Redhead* 3401 (typus varietatis in Herb. Kew.) :—erect perennial ; leaves reflexed ; corolla 4-lobed, white.

ANGOLA. Bié District. On the Longa near Napalanka, alt. 1250 m., 28 Dec. 1899, *Baum* 589. Chipumba Rivulet, Cuelai, *Gossweiler* 3515.

The African bedstraws are often very difficult to disentangle, a condition not unknown in this genus in other parts of the world. Hitherto *G. scioanum* Chiov. has been known only from its Abyssinian type, but is now shown to cover plants ranging as far to the south as Angola which have been scattered about in herbaria under a rather shocking assortment of names.

G. scioanum has white flowers and differs in this from the yellow-flowered *G. scabrellum* K. Schum. and *G. mollicomum* Bullock, which may otherwise be superficially rather like it. *G. mollicomum* differs in addition in habit, and *G. scabrellum* in the reflexed teeth on the leaf-margins, and both in their smaller flowers.

Among the non-yellow-flowered African bedstraws, *G. scioanum* differs from *G. simense* Hochst. ex A. Rich., non Fresen., in the much more robust habit, the strong tendency in the leaves to become reflexed, in the many-flowered cymes, white not purplish flowers, and smaller fruits. *G. stenophyllum* Baker is probably the closest African relative but differs in habit and in the linear non-reflexed leaves ; in *G. scioanum* the leaves are usually lanceolate and seem not to be parallel-sided ; they are also normally shorter than in *G. stenophyllum*.

Although *G. scioanum* var. *glabrum* has been misidentified with *G. mollugo* L., there is not really much similarity. On the other hand the var. *glabrum* is extremely like the European *G. palustre* L., particularly its var. *witheringii* (Sm.) Bab. Besides the difference in geography (*G. palustre* is not known from tropical Africa) the most obvious separating character is the leaf-tip, blunt in *G. palustre*, but with a short, deflexed, rather abrupt but decidedly acute point in *G. scioanum*.

The type of *G. scioanum* is densely pubescent and looks very different from that of var. *glabrum*, but except for some variation in robustness this is entirely due to the amount of pubescence. The presence of very slight pubescence on *Michelmores* 934, and the fact that *Albrechtsen* 6717 comes almost midway between the extremes of the type and var. *glabrum* convinces me that to pay but little attention to the amount of pubescence in this species is the right thing to do.

J. P. M. BRENNAN.

COMPOSITAE

FELICIA EYLESII S. Moore in Journ. Bot. **64**, 304 (1926).

As a result of information received from Dr. H. Wild, of the Department of Agriculture and Lands, Southern Rhodesia, Kew specimens

named *Felicia eylesii* S. Moore have been re-examined, and are found to include two distinct species, one indistinguishable from *F. homochroma* S. Moore, the other (including type *F. eylesii*) apparently conspecific with *F. barbellata* S. Moore. Both species are slender, erect, annual herbs, remarkably alike superficially, though readily distinguished, on closer examination, by the characters set out below :—

Pappus *distinctly plumose* ; leaves entire or almost entire, peduncles glandular-pilose ; ray florets at first white or pink, later red or purple 1. *F. barbellata*

Pappus *minutely scabrid* ; leaves usually denticulate, peduncles glabrous or shortly glandular ; ray florets at first yellow, later orange-red or purple 2. *F. homochroma*

1. ***Felicia barbellata*** S. Moore in Journ. Linn. Soc. Bot. **37**, 314 (1906).
F. eylesii S. Moore in Journ. Bot. **64**, 304 (1926).

Aster eylesii (S. Moore) Milne-Redhead in Hook. Ic. Pl. **33**, sub t. 3243, p. 2 (1934).

.. SOUTHERN RHODESIA. Salisbury, May 1911, *Albany Museum, Grahams-town* no. 26 (no collector given). Rua River near Salisbury, in *Brachystegia* bush, 1500 m., June 1918, *Eyles* 1335 (type of *F. eylesii*) :—erect ; open flowers [with] white to pink rays and yellow centre. Salisbury, 1 May 1932, *Eyles* 7143 :—small herb ; ray dark red.

NORTHERN RHODESIA. Broken Hill District. Johnston's Farm near Broken Hill, on sandstone, c. 1200 m., May 1909, *Rogers* 8108. Serenje District, 32 Km. SW. of Serenje Corner, 1590 m., *Hutchinson & Gillett* 3705 :—[heads] purple. Mpika District. 108 Km. NE. of Serenje Corner, in *Brachystegia* woodland, 16 July 1930, *Hutchinson & Gillett* 3752 :—flowers pale blue or crimson. Mumbwa District. Mumbwa, *Macaulay* 841 :—small yellow or red "thistle" with dark red anthers.

ANGOLA. Malange District. Pomça Uremba near Malange, in shady spots or in open woods, 26 June 1902, *Gossweiler* 1150 (type of *F. barbellata*) :—a weak annual, 6–9 dm. high, branched towards the top ; ray flowers white, but soon fading with disk flowers becoming more prominent, scarlet-red.

Spencer Moore seems to have overlooked *F. barbellata* when describing *F. eylesii* ; he compares the latter with *F. abyssinica* Sch. Bip., a very distinct species, without commenting on the much more obvious affinity with *F. barbellata*. Moreover *F. eylesii* is described as having scabrid pappus, though in the type the pappus is distinctly plumose.

2. ***Felicia homochroma*** S. Moore in Journ. Bot. **59**, 229 (1921).

[*Aster crenulatus* Hutch., Botanist in S. Afr. 484 (1946), *nomen nudum*.].

BELGIAN CONGO. Katanga Province. Elisabethville, *Rogers* 26220 (type). Kasombo, Elisabethville, 1934, *Quarré* 4142.

TANGANYIKA. Rungwe District. Near Kymbila, 9 July 1912, *Stolz* 1436.

NYASALAND. Kota-Kota District. Nchisi Mt., plentiful in shallow seepage-soil in *Brachystegia* woodland, 1400 m., 24 July 1946, *Brass* 16915 : herb 10–30 cm. high.

NORTHERN RHODESIA. Livingstone District. Zimba, 1200 m., 10 July 1930, *Hutchinson & Gillett* 3509 :—[heads] yellow-orange. Broken Hill District. About 45 Km. SW. of Broken Hill, in *Brachystegia* woodland, 1140 m., 13 July 1920, *Hutchinson & Gillett* 3604 :—[heads] dark yellow. Mukushi District. 8 Km. E. of Chiwefwe, in *Brachystegia* woodland, 1350 m., 15 July 1930, *Hutchinson & Gillett* 3676 :—[heads] yellow turning orange. Mumbwa District. Near Mumbwa, *Macaulay* 333 :—[heads] yellow-brown. Ndola District. Mufulira, in open forest, 2 May 1934, *Eyles* 8265 :—flowers yellow ; tips of inner segments of involucre red. Mufulira, as above, 17 May 1934, *Eyles* 8327 :—contrasted red flowers and yellow flowers on one plant. Solwezi District. On dry bare ground in *Brachystegia* woodland at Solwezi, 4 June 1930, *Milne-Redhead* 418 :—erect annual weed ; flowers yellow ; rays turning purplish in age.

I can find no published description of *Felicia crenulata* Mattf., though the name appears on a specimen of *F. homochroma* from Tanganyika (*Stolz* 1436) ; *Aster crenulatus* Hutch. is apparently based on this MS. name.

The leaves and stems of *F. homochroma* turn red or purple on drying, whilst specimens of *F. barbellata* do not show this discolouration.

R. D. MEIKLE.

Emilia praetermissa *Milne-Redhead*, sp. nov., affinis *E. coccineae* Curt., sed folis valde dentatis, capitulis longioribus et angustioribus et floribus lacteis differt.

Herba annua, usque 9 dm. alta. *Caules* erecti vel adscendentes, simplices vel basi ramosi, inferne leviter pilosi, superne glabri ; internodia basin versus 0·6–2·0 cm. longa, superne usque 9 cm. longa. *Folii* infimi lamina late ovata, subcordata, in petiolum attenuata, margine angulata, 4·0 cm. longa, 4·5 cm. lata ; petiolus 1·5–2·5 cm. longus, parce pilosus, exalatus et exauriculatus ; foliorum inferiorum (2–3) lamina late ovata, subcordata, in petiolum attenuata, margine valde dentata, circiter 6 cm. longa et 6 cm. lata ; petiolus 2–3 cm. longus, alatus, exauriculatus, parcissime pilosus ; folia caulis medium versus sita inferioribus similia sed basi conspicue auriculata, auriculis alisque valde dentatis ; folia superiora sessilia, auriculato-cordata, plus minusve deltoidea, margine conspicue dentata, inferne ad costam parce pilosa. *Capitula* erecta, 3–4 in cymam disposita ; bracteae anguste lanceolatae, apice attenuatae, 8–11 mm. longae, basin versus saepe unidentatae, conspicue pilosae ; capitulae sub anthesi in toto 15 mm. longa, basi 4 mm., medium versus 3 mm. et apice 8–9 mm. diametro ; involucri bracteae circiter 12, circiter 10 mm. longae, inferne glabrae, superne parce pilosae. *Flores* tubulosae ; corollae tubus 8 mm. longus ; lobi 2 mm. longi, adscendentes. *Antherae* 1·7 mm. longae, apice appendiculatae. *Styli* rami circiter 1·2 mm. longi, recurvati, apice extra minute hispidi, haud appendiculati. *Ovarium* 2·5 mm. longum, 5-costatum, costis adpresse papilloso-hirsutis. *Pappus* circiter 7 mm. longus, minute barbellatus. *Achaenia* angustissime truncato-ellipsoidia, 3 mm. longa, 5-costata, costis hispidis.

SIERRA LEONE. Common weed, Hill Station, Freetown, 30 Dec. 1926, *Deighton* 489 :—herbaceous, 9 dm. high ; flowers pale yellow.

Heddle's Farm, Freetown, weed, 8 May 1928, *Deighton* 1188 (type) :—flowers pale yellow. Regent Reservoir, Freetown, 30 Apr. 1949, *H. C. King* 182, 182B :—herb up to 6 dm. high ; florets pale pinkish white. Wellington, weed in empoldered area of tidal *Avicennia* swamp, 22 Febr. 1949, *Deighton* 4984 :—3–6 dm. high.

NIGERIA. Agege Agricultural Experimental Station, near Lagos, 28 Apr. 1948, *J. T. Baldwin* 11981. Abeokuta Province. Olokemeji Forest Reserve, Nov. 1945, *Jones, Keay & Onochie*, in *For. Herb.*, Ibadan 4943 :—flowers cream with orange anthers.

My attention was first called to this species by Dr. J. T. Baldwin Jr., of William and Mary College, Virginia, who collected specimens and seed of it in Nigeria in 1948. Cytological examination of this gathering showed it to have a 2n-number of 20 chromosomes, whilst the number found in the common West African species, *E. coccinea*, is $2n=10$. Further specimens of what appeared to be the same species were found in the covers of *E. coccinea* at Kew. These were both from Freetown, collected by Mr. F. C. Deighton over 20 years ago. I mentioned this plant to Mr. Deighton when he was home on leave, and he took steps to obtain further specimens and ripe seed through Mr. H. C. King of the Sierra Leone Forest Department. This seed was sent to Dr. Baldwin who has confirmed that the Sierra Leone plant agrees with his Lagos gathering in having the $2n\text{-number}=20$ (See Baldwin and Speese in *Bull. Torr. Bot. Club* **76**, 348–51 : 1949).

The colour of the flowers appears to be very characteristic. The corolla is mainly cream-coloured with a mauve tinge at the very tips of the segments scarcely noticeable to the naked eye. The anthers are orange red, the pollen is golden yellow, and the style-arms are buff with bright red tips to the arms.

E. MILNE-REDHEAD.

Crassocephalum bauchiense (*Hutch.*) *Milne-Redhead*, comb. nov.

Gynura caerulea Hutch. et Dalz., *Fl. W. Trop. Afr.* **2**, 147–8 (1931), non O. Hoffm. (1893), *nom illegit.*

Gynura bauchiensis Hutch. in Hutch. et Dalz., *Fl. W. Trop. Afr.* **2**, 608 (1936).

C. bauchiense, hitherto known only from Nigeria, has now been found in the Mwinilunga District of Northern Rhodesia (*Milne-Redhead* 4435) and in Mubende, Uganda (*A. S. Thomas* 4320).

E. MILNE-REDHEAD.

Crassocephalum montuosum (*S. Moore*) *Milne-Redhead*, comb. nov.

Senecio montuosus S. Moore in *Journ. Linn. Soc. Bot.* **36**, 354 (1902).

Crassocephalum bumbense S. Moore in *Journ. Linn. Soc. Bot.* **47**, 279 (1925).

Gynura montuosa (S. Moore) Bullock in *Bull. Misc. Inform. Kew* **1932**, 499 (1932).

This species, like several other species of *Crassocephalum*, is very variable in leaf-shape. I consider *C. afromontanum* R. E. Fries may be merely an extreme variety with entire leaves rather suddenly narrowed into the petiole, and fewer capitula, but I await further gatherings and fuller information before coming to a definite conclusion regarding its status.

In herbaria *C. montuosum* has been much confused with *C. crepidioides* (Benth.) S. Moore.

E. MILNE-REDHEAD.

Crassocephalum baoulense (A. Chev.) Milne-Redhead, comb. nov.

Senecio baoulensis A. Chev. in Bull. Soc. Bot. Fr. **61**, Mém. **8**, 260 (1917).

Gynura baoulensis (A. Chev.) Hutch. et Dalz., Fl. W. Trop. Afr. **2**, 148 (1931).

An excellent gathering of this apparently local species has been received from the Gold Coast (*Vigne in Forest Herb.* 3470), where it was growing in damp places in savannah forest at Ejura, Ashanti.

E. MILNE-REDHEAD.

Crassocephalum mannii (Hook. f.) Milne-Redhead, comb. nov.

Senecio mannii Hook. f. in Journ. Linn. Soc. Bot. **6**, 14 (1862).

Senecio multicorymbosus Klatt in Ann. Naturh. Hofmus. Wien **7**, 103 (1892).

Senecio acervatus S. Moore in Journ. Linn. Soc. Bot. **40**, 121 (1911).

Crassocephalum multicorymbosum (Klatt) S. Moore in Journ. Bot. **50**, 211 (1912).

Whilst the size of the capitulum, the number of involucre bracts and the degree of indumentum of the leaves varies considerably from specimen to specimen, these characters do not appear to be correlated, nor are they related to any particular geographical area. In view of this I am unable to retain *Crassocephalum multicorymbosum* as a species distinct from *C. mannii*.

It is strange that *C. mannii* appears never to have been recognized as belonging to *Crassocephalum* nor to *Gynura* in the broad sense, especially as *Senecio multicorymbosus* was referred to *Crassocephalum* by Spencer Moore as long ago as 1912.

E. MILNE-REDHEAD.

GENTIANACEAE

Exochaenium pygmaeum Milne-Redhead, sp. nov. affinis *E. pumilo* (Bak.) A. W. Hill, a qua foliis minoribus, filamentis antheras cum glandulis apicalibus plus minusve aequantibus, glandula apicali plus minusve antheram aequilonga, anthera basi biglandulosa distinguenda.

Herba annua vel fortasse perennis, erecta, 3.0–5.5 cm. alta, glabra. *Caules* 1–3, simplices vel ramosi, 4-alati, foliosi; internodia 2.5–8.0 mm. longa. *Folia* sessilia, late ovata, basi rotundata, margine in alam caulis decurrentia, apice acuta vel apiculata, usque 4 mm. longa et 3.5 mm. lata, sed saepe minora. *Flores* in cymas pauci- vel multifloras densiuscule dispositi, in toto 7.5–8.0 mm. longi, 5- vel interdum 6-meri; pedicelli 0.3–1.3 mm. longi. *Calyx* circiter 4 mm. longus; segmenta lanceolata, acuta, dorsaliter valde alata, ala infra medium latissima, basi paullum connata, intus basin versus annulo squamarum instructa. *Corolla* anguste infundibuliformis; tubus 3.5–4 mm. longus; lobi anguste obovati, obtusiusculi, 2.5–3 mm. longi. *Stamina* infra medium corollae tubum orta; filamenta circiter 1.3 mm. longa; antherae circiter

0.7 mm. longae, apice uniglandulosae, glandula 0.7 mm. longa minute papillosa, basi glandulis duobus minutis instructae. *Ovarium* compresso-ellipsoideum, circiter 1.2 mm. altum ; stylus circiter 1.2 m. longum ; stigma elongatum, dense et conspicue papillosum, demum bifidum. Fructus mihi ignotus.

NORTHERN RHODESIA. Mwinilunga District. Sinkabolo Dambo, in boggy not waterlogged grassland, 9 Dec. 1937. *Milne-Redhead* 3579 :—very dwarf, ? annual ; roots rather fleshy ; stems and leaves pale green ; calyx with keeled lobes, pale green ; corolla white with yellow tube.

Exochaenium pygmaeum is very similar in appearance to *E. pumilum* (Bak.) A. W. Hill, a species based on a specimen collected by Barter (no. 1680) on Dr. Baikie's Niger Expedition, 1857–59, at Nupe in Nigeria. The description is exceedingly poor, and no mention is made of the length of the stamens or the size of the anthers. Hill (Bull. Misc. Inform. Kew **1908**, 336 : 1908) calls attention to the presence of heterostyly in certain species of *Exochaenium*. It appears, however, to be confined to the species with relatively large and showy flowers, and there is no evidence to suggest that it occurs either in *E. pumilum* or *E. pygmaeum*. In both these species the anthers in every flower that I have examined have been held level with and closely surrounding the stigma, suggesting that the flowers may be self-pollinated. It therefore seems that the relative lengths of the filaments, the anthers and their apical glands are likely to be sound diagnostic characters.

E. MILNE-REDHEAD.

CAMPANULACEAE

Cyphia erecta De Wild., Ann. Mus. Cong., sér. IV, **1**, 162 (1902).

Cyphia scandens De Wild., Ann. Mus. Cong., sér. IV, **1**, 163 (1902).

BELGIAN CONGO. Katanga Province. Lukafu, Dec. 1899, *Verdick* 345 (type of *C. erecta* in Brussels Herb.). Lukafu, Febr. 1900, *Verdick* 368 (type of *C. scandens* in Brussels Herb.).

NORTHERN RHODESIA. Kawambwa District. Mbereshi, fairly common in grassy plains, 1170 m., Mar. 1932, *E. G. Walter* 16 :—flowers white, without scent. Ndola District. Mufulira, in woodland, 30 Nov. 1947, *Cruse* 87 :—flowers mauve ; do., 3 Jan. 1948, *Cruse* 225. Mwinilunga District. Without locality [probably Kalene Hill], *J. M. Marks* s.n. Kalenda Dambo, N. of Matonchi Farm, in "lateritic" grassland in open, not in bog, 10 Dec. 1937, *Milne-Redhead* 3593 :—stems erect or twining from tuberous rootstock, purplish ; leaves green with purple margin ; corolla deep bright purple, paler underneath and at throat.

The plant collected by me in Northern Rhodesia was found to be conspecific with a number of unnamed gatherings of a *Cyphia*, also from Northern Rhodesia. Examination of the descriptions of *C. erecta* De Wild. and *C. scandens* De Wild. left me in doubt as to which of these species the Kew material should be referred. The chief difference appeared to be one of habit, *C. erecta* being described as a herbaceous plant more than 20 cm. high, whilst *C. scandens* was said to be a small climbing plant. Apart from this, the descriptions agreed in everything

but the size of the flowers, those of *C. scandens* being distinctly smaller than those of *C. erecta*. The habit character was shown by my gathering to be unsound. One of my plants has a lateral branch twining up the erect main branch of the same individual !

Examination of the two type specimens has been made possible through the kindness of Prof. W. Robyns, Director of the State Botanic Gardens at Brussels. Careful comparison of them with the five gatherings at Kew convinces me that they represent but one somewhat variable species. Apart from habit and flower-size, the size and shape of the leaves and their degree of toothing are other variables. I have tabulated the values of three characters for a number of the specimens examined, and it will be seen that there is no significant correlation between these figures.

	<i>Cruse</i> 225	<i>Marks</i>	<i>Verdick</i> 345	<i>Verdick</i> 368	<i>Walter</i> 16	<i>M.-R.</i> 3593
Narrowest leaf (mm.)	12	4	6	5	6	4
Widest leaf (mm.) ...	24	11	9	11	10	14
Length of corolla (mm.)	14	12-15	12	9	13	10-13

Cruse 225 is a strikingly wide-leaved form, but in other respects is quite typical of *C. erecta*. The type of *C. scandens* is in my opinion a late season condition, showing a marked twining tendency due probably to its growing among taller grass, whilst its lateness might well account for its smaller flowers. It is clear that the type of *C. erecta* is the more normal form of the species, and I accordingly retain that name for the species, although I realize the epithet is unfortunately misleading.

The diagnostic character to which I attach the greatest importance is the dense woolly indumentum inside the lower part of the perianth lobes and on the anthers. This character is constant throughout the above cited specimens.

All collectors of *C. erecta* have failed to procure the rootstock. I found the plant to possess a subspherical tuber about 2 cm. in diameter and situated about 5 cm. below the ground level. The plant breaks off very easily above the tuber, as happens so readily in the case of our British *Conopodium*.

I would again emphasize the importance of collectors obtaining the underground parts of herbaceous plants, as they so often afford useful taxonomic characters and provide interesting information regarding the biology of the species.

E. MILNE-REDHEAD.

SCROPHULARIACEAE

Limnophila bangweolensis (*R. E. Fries*) *Verdcourt*, comb. nov.

Ambulia bangweolensis *R. E. Fries*, *Wiss. Ergebn. Schwed. Rhod.-Kongo-Exped. 1911-12*, **1**, 288 (1916).

Since *Ambulia* Lam. is a *nomen rejiciendum* a new combination is required. Only one sheet of this plant is preserved at Kew, and this would appear to be the first gathering made since the plant was originally found in 1911 by R. E. Fries. This, the type specimen, has not been seen, but the Kew sheet agrees very well with the excellent description given by Fries and also with his figure. The Kew sheet (*Greenway* 6213) bears the following data : " a perennial aquatic herb with small white flowers, growing in water in a moorland drainage peat bog. Locally dominant with *Sphaeranthus* and a yellow flowered *Limnanthemum*. Aquatic leaves finely dissected. North of Abercorn, c. 5000 ft. altitude, 8/7/1941 ".

B. VERDCOURT.

LABIATAE

Englerastrum gracillimum T. C. E. Fries in Notizbl. Bot. Gart. Berl. **9**, 69, tt. 1b, 2a (1924).

Englerastrum diffusum Alston in Bull. Misc. Inform. Kew, **1926**, 298 (1926).

Plectranthus gracillimus (T. C. E. Fries) Hutch. et Dandy in Bull. Misc. Inform. Kew, **1926**, 481 (1926).

Plectranthus tenuis Hutch. et Dandy, l.c. 481 (1926) ; Hutch. et Dalz., Fl. W. Trop. Afr. **2**, 289 (1931).

Coleus diffusus (Alston) Robyns et Lebrun in Ann. Soc. Sci. Brux., sér. B, **49**, 106 (1929).

Coleus gracillimus (T. C. E. Fries) Robyns et Lebrun, l.c. 106 (1929).

SIERRA LEONE. Region of the source of the Niger, at Sorémodou [Seremodu, Deliduge Chiefdom], 28 Jan. 1909, *Chevalier* 20567.

NIGERIA. Nupe, 1858, *Barter* s.n. (type of *E. diffusum*). Ilorin District. Ilorin-Jebba road near R. Oshin Bridge, on stony ground amongst recently burnt scrub, 1 Dec. 1949, *Meikle* 675 :—erect annual up to 7 dm. high, very viscid, without leaves ; flowers bright blue. Plateau District. Mada Hills, Wana, in rock crevices, 600 m., May 1930, *Hepburn* 92 :—flowers blue. Muri Province, weed in arable land, 20 Nov. 1914, *P. H. Lamb* 72 :—flowers minute, blue.

BELGIAN CONGO. Mont Corva, 15 May 1895, *Descamps* s.n. (type of *E. gracillimum* in Berlin Herbarium) :—very pretty blue flowers.

NORTHERN RHODESIA. Mkushi District. 8 Km. NE. of Chiwefwe, 14 July 1930, *Hutchinson & Gillett* 3663 :—flowers sky-blue. Ndola District. Mufulira, in open forest, 29 May 1934, *Eyles* 8215 :—erect, no leaves ; panicle brittle, very viscid ; flowers glistening blue. 3 miles E. of Mufulira, in laterite area of *Brachystegia* woodland, 1200 m., 13 June 1948, *Cruse* 368 :—plants erect ; stems woody, brown ; leaves fallen ; pedicels very slender, sticky with black tarry substance ; flowers semi-transparent, blue.

This widely spread annual possesses an unusually large number of names. Until the genuine limits of the members of the *Ocimoideae* are more satisfactorily defined, I prefer to leave this plant where Fries placed it, in *Englerastrum*.

E. MILNE-REDHEAD.

Monechma ciliatum (Jacq.) Milne-Redhead in Bull. Misc. Inform. Kew, 1934, 304 (1934).

Hygrophila lutea T. Anders. in Journ. Linn. Soc. 7, 22 (1864), synon. nov. ; Burkill in Dyer, Fl. Trop. Afr. 5, 32 (1899) ; Hutch. & Dalz., Fl. W. Trop. Afr. 2, 247 (1931).

Examination of the type specimen of *Hygrophila lutea* T. Anders. (Barter 1163 from Onitsha) shows it to be a galled state of *Monechma ciliatum*. Barter states "flowers bright yellow", but Anderson does not appear to have seen any corollas. He describes the calyx taken from a galled subglobose inflorescence and states "Corolla parva, lutea". He does not give his reasons for placing the plant in *Hygrophila*. Burkill retained the species in *Hygrophila*, as no further evidence had in the meantime come to light to throw doubt on Anderson's view. In 1919 a specimen of *Acanthaceae* was received from Lely from Sokoto, Nigeria, showing both galled and normal inflorescences and this was named by Turrill as *Monechma hispidum* Hochst., the name by which *M. ciliatum* was known in the Flora of Tropical Africa. Its similarity to *H. lutea* was not then recognized, neither was it in 1931 when Hutchinson & Dalziel retained Barter's specimen under *Hygrophila*, whilst agreeing that Lely's specimen was *Monechma*. The above interpretation of *H. lutea* would account for that species not having been seen again since Barter got it. The creature which caused the gall remains unknown.

E. MILNE-REDHEAD.

VELLOZIACEAE

Vellozia schnitzleinia (Hochst.) Bak. var. ***occidentalis*** Milne-Redhead, var. nov. ; a *V. schnitzleinia* (Hochst.) Bak. var. *schnitzleinia* caudice valde evoluto facile distinguenda.

Frutex nanus. *Caudices* numerosi, usque 5 dm. longi, 1.5–2 cm. diametro, simplices (vel interdum bifurcati, teste Keay), basibus foliorum delapsorum imbricatis persistentibus dense tecti, brunnei. *Folia* circiter 12, ad apicem caudicis conferta, linearia, rigide coriacea, superne in apicem acutum sensim angustata, dorso plus minusve plicata, usque 32 cm. longa 6 mm. lata, glabra sed margine et nervo dorsali praesertim apicem versus minute et inconspicue aculeolata, praesertim in pagina inferiore nervoso-striata, margine incrassata. *Pedunculi* foliis breviores sed sub fructum iis plus minusve aequilongi, in axillis foliorum solitarii, rigidi, inferne glabri, superne apicem versus dense patentem setosi. *Perianthii* tubus ovario adnatus, setis patentibus dense vestitus ; lobi glabri, lineari-lanceolati, apice acuti, 3 exteriores circiter 35 mm. longi et 8 mm. lati, 3 interiores circiter 30 mm. longi et 10 mm. lati. *Antherae* sessiles, basi perianthii loborum affixae, lineares, 17–20 mm. longae, stylum leviter excedentes. *Stylus* filiformis, inconspicue triqueter et trisulcatus, totus circiter 16 mm. longus, stigmatibus 3 circiter 10 mm. longis longitudinaliter vestitus. *Ovarium* circiter 6 mm. altum, 4 mm. diametro, obtuse obscureque triquetrum ; ovula in loculis numerosissima. *Fructus* subglobosus, obscure triqueter, circiter 17 mm. altus et 15 mm. diametro, perianthio marcido coronatus ; semina subcylindrica ; testa spadicea, dorso et apice in appendicem aliformem hyalinam plus minusve inflatam et spongiosam producta, circiter 3 mm. longa et 0.6 × 1 mm. diametro.

NIGERIA. Zaria Province. Zaria District. Anara Forest Reserve,

Kan Gimi, on flat gneiss outcrop behind Rest House, with *Sarcostemma viminale* and *Bombax* sp., 7 May 1948, *Keay in Forest Herb.*, Ibadan 22903 :—perennial herb forming thick mat on bare rock ; shoots erect up to 50 cm. (to base of fresh leaves) sometimes bifurcated but usually unbranched ; stems covered with brown remains of old leaves ; fresh leaves leathery, pale green ; each stem with 1–3 flowers, the pedicels lengthening after flowering so that the earliest flower (now in fruit) may be 10–12 cm. above the youngest ; pedicel and ovary pale green with white hairs ; the hairs on the unripe fruit are stiff and bristly ; perianth segments spreading white, closing together in the fruiting stage and becoming purple ; unripe anthers pale yellow ; pollen orange, stigma and style cream ; young fruits green. Same locality, in open savannah woodland with *Isoborlinia doka* and scattered *Gardenia* sp., 23 Sept. 1948, *J. Olorunfemi in For. Herb.*, Ibadan 24356 :—herb of about 3 dm. high, growing on rocks ; stems rough ; flowers white ; ovary hairy.

Mr. R. W. J. Keay of the Nigeria Forest Service is to be congratulated on discovering a member of the *Velloziaceae* in Nigeria and on the excellently prepared and carefully annotated specimens of it which he has submitted to Kew. Hitherto the family *Velloziaceae* was unknown from the area covered by Hutchinson & Dalziel's *Flora of West Tropical Africa*, and, in fact, from the whole Sudan region except for an unnamed sterile specimen collected by the late Mr. J. G. Myers (no. 9518) on the summit of Mt. Iro in the Equatoria Province of the Anglo-Egyptian Sudan. In the dry region farther east, however, both in the Turkana district of Kenya and in southern Abyssinia around Arussi there is a species, *Vellozia schnitzleinia* (Hochst.) Bak., which seems to be frequent in its occurrence and which is undoubtedly very closely allied to the Nigerian plant. In fact the only firm character that I have been able to find in order to distinguish these plants is the presence of a well developed stem, some half a meter tall in the Nigerian plant, whilst *V. schnitzleinia* has a stem at most 8 cm. long, but usually less than half that length. In view of the importance which I place on characters of habit, and considering the apparent geographical isolation of the Nigerian plant, I am choosing to describe it as a distinct variety, *occidentalis*, of *V. schnitzleinia*.

The scarcity of the *Velloziaceae* in West Africa is very remarkable*, as the family is strongly represented in tropical South America, and the climate and physiography of large areas of West Africa would appear to afford eminently suitable habitats. Can it be that its Cyperaceous rivals, *Micradracodes* Hua and *Trilepis* Nees† have all but won in the battle for existence ?

E. MILNE-REDHEAD.

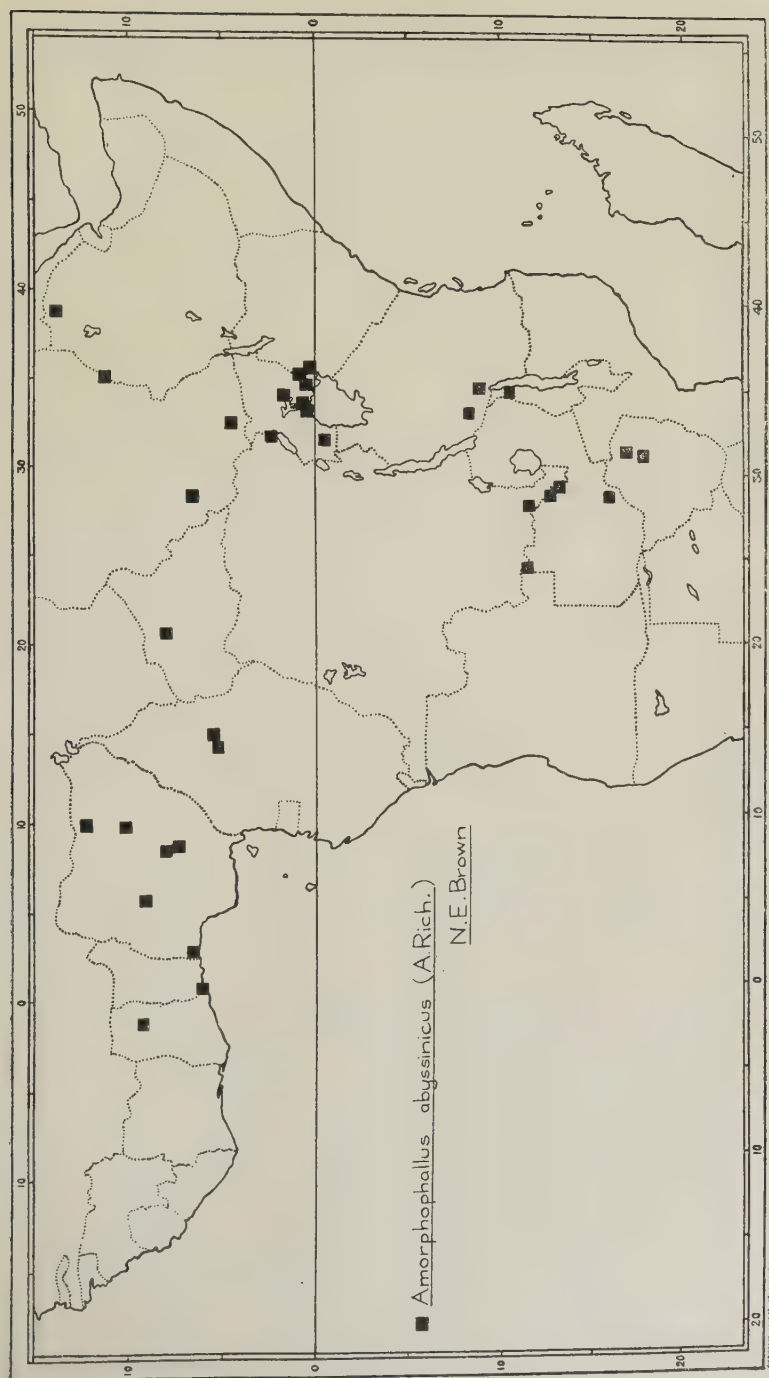
ARACEAE.

Amorphophallus abyssinicus (A. Rich.) N. E. Br. in Dyer, *Fl. Trop. Afr.* **8**, 160 (1901), non Gombocz (1936).

Arum abyssinicum A. Rich., *Tent. Fl. Abyss.* **2**, 352 (1851).

*Through the kindness of Prof. Dr. Emilio Guinea López, I have been able to examine the specimen from Spanish Guinea cited as *Barbacenia Schnizleiniana* (Bak.) Pax " on page 258 of his *Ensayo Geobotánico de la Guinea Continental Española* (1946). This specimen, which is sterile, is undoubtedly Cyperaceous and I would suggest it is a species of *Trilepis* Nees. This view is confirmed by my colleague, Dr. C. R. Metcalfe, who has kindly compared the leaf anatomy with that of *Trilepis*.

†See Gilly in *Brittonia* **5**, 9 (1943).

Fig. 9. Distribution of *Amorphophallus abyssinicus*.

Sauromatum abyssinicum (A. Rich.) Schott, Syn. Aroid. **1**, 25 (1856).

[*Hydrosme fontanesii* (Kunth) Schott, sec. Schott, Prodr. Syst. Aroid. 133 (1860), pro parte, quoad descr. infl. et spec. Barteri, non *Amorphophallus fontanesii* Kunth, Enum. Pl. **3**, 35 (1841)].

Hydrosme schweinfurthii Engl. in DC., Mon. Phan. **2**, 322 (1879).

Amorphophallus schweinfurthii (Engl.) N. E. Br. in Dyer, Fl. Trop. Afr. **8**, 149 (1901).

Amorphophallus barteri N. E. Br. in Dyer, Fl. Trop. Afr. **8**, 151 (1901).

[*Amorphophallus mossambicensis* (non Klotzsch ex Garcke).—N. E. Br. in Dyer, Fl. Trop. Afr. **8**, 150 (1901), pro parte, quoad spec. Scottii.].

Hydrosme warneckei Engl. in Engl., Bot. Jahrb. **36**, 238 (1905).

Hydrosme chevalieri Engl. in Bull. Soc. Bot. Fr. **54**, Mém. **8**, 24 (1907).

Amorphophallus warneckei (Engl.) Engl. et Gehrm. in Engl., Pflanzenr. IV, **23C**, 71 (1911).

Amorphophallus chevalieri (Engl.) Engl. et Gehrm. in Engl., Pflanzenr. IV, **23C**, 69 (1911).

The characters used both by N. E. Brown and by Engler for diagnostic purposes in *Amorphophallus* Blume sect. *Hydrosme* (Engl.) Engl. are, in my opinion, unsound. The relative lengths of the sterile portion of the spadix, both compared with the fertile portion of the spadix and with the spathe are extremely variable even in plants taken from a single locality. I place importance neither on the degree of lobing of the stigma, nor on the extent of the undulation of the spathe margin, and I find the shape of the ultimate divisions of the leaves to range from obovate acuminate to narrowly oblanceolate. Characters which I consider to be of specific diagnostic importance are the glabrous strongly ribbed inner surface of the convolute lower portion of the spathe, the strongly glaucous zone on the inner surface at the base of the spathe where it is constricted around the spadix, and the sessile stigma.

The species is widely distributed in the savannah regions of Africa, as is shown by the accompanying map (Fig. 9), and is, as indicated above, extremely variable. There would appear to be a tendency for plants with shorter and more slender appendices to the spadices to occur more frequently in the north-western area of distribution. Yet a specimen from Tamale in the Gold Coast has a large appendix and is indistinguishable in the dried state from specimens collected near Lake Rukwa in southern Tanganyika. One does not get a completely fair idea of the species by examining herbarium material, as there is a natural tendency for collectors to gather from a population the smaller inflorescences which offer less difficulty in the press.

I would like to convey my thanks to Prof. H. Humbert, Director of the Muséum Nationale d'Histoire Naturelle, Paris, for kindly sending on loan to Kew both the type specimen of *Arum abyssinicum* A. Rich. and five sheets of *Hydrosme chevalieri* Engl.* without seeing which I should have been unable to have arrived at the above conclusions. I would also like to thank Dr. H. Wild, of Salisbury, Southern Rhodesia, and Mr. R. W. J. Keay of Ibadan, Nigeria, for supplying me with specimens and information.

E. MILNE-REDHEAD.

* Of the five sheets written up as *H. chevalieri* Engl., I have selected *Chevalier* 8399 as the lectotype of that specific name.

A NEW GENUS OF INDIAN GRASSES

N. L. BOR

Hubbardia Bor genus novum *Graminearum* : tribus *Isachnearum* :—

Spiculae paniculatae, oblongo-ellipticae, obtusae vel acutae, exaristatae, parvae, pedicellatae ; anthoecia duo, inter glumas inclusa ; inferius ad lemma redactum ; superius hermaphroditum ; rhachilla brevissima, supra glumas disarticulans, supra anthoecium superius haud producta. *Glumae* aequales, plus minus similes, spiculis aequilongae, membranaceae, 7-nerves, dorso convexae, 7-costatae, inter nervos dorso pilis brevibus e tuberculis ortis praeditae. *Anthoecium inferius* vacuum ; lemma oblongo-ellipticum, apice obtusum, laeve, glabrum, valide 7-nerve ; palea nulla. *Anthoecium superius* hermaphroditum ; lemma eo anthoecii inferioris simile, 7-nerve, laeve, glabrum ; palea nulla ; stamina 3 ; antherae parvae ; styli 2 ; stigmata plumosa ; lodiculae non visae ; caryopsis fusiformis, lemmate superiore inclusa ; hilum breve, lineare.

Gramina annua, saxis humidis incola ; culmi graciles vel gracillimi, reptantes, pauci-nodes plerumque multi-nodes, e nodis radicanes ; laminae tenuissimae ; ligulae nullae ; paniculae multi-vel paucispiculatae ex culmorum nodis omnibus emergentes, nonnunquam ad spiculam singulam nodis inferioribus redactae.

Species unica, India orientali incola.

Hubbardia heptaneuron Bor ; species nova :—Gramen annuum, saxis humidis incolum. *Culmi* plerumque prostrati, e nodis radicanes, demum apicibus erecti vel penduli, pauci- vel multi-nodes, striati, gracillimi, ramosi, innovationibus intravaginalibus, nodis glabri. *Foliorum laminae* ad 3 cm. longae, 6 mm. latae, ellipticae vel oblongo-ellipticae, apice acutae, basi rotundatae, tenuissimae, papyraceae, supra nervis longitudinalibus pilis brevibus distiche patulis tectae, infra nervis pilis longibus sparse tectae sed inter nervos pilis aureis brevissimis numerosis praeditae, pallide virides, fere translucens, marginibus scabrae ; *vaginae* internodiis breviores, laxissimae, e culmis solutae, striatae, nervis minutissime pilosae, sed marginibus et dorso versus pilis longioribus praeditae ; *ligulae* nullae.

Paniculae numerosae, ex nodis omnibus emergentes, multi- vel paucispiculatae, nonnunquam ad spiculam singulam redactae ; rami capillares, laeves glabrique ; ramuli terminales spiculas longe pedicellatas gerentes. *Spiculae* 2–3 mm. longae, teretes ; *gluma inferior* spiculae aequilonga, oblongo-acuta, nonnunquam obtusa vel apice erosa, conspicue 7-nervis, dorso inter nervos pilis brevibus e tuberculis ortis scabra ; *gluma superior* similis, 7-nervis, dorso scabra, pilis brevibus nervis exterioribus apicem versus praedita. *Anthoecium inferius* vacuum ; lemma oblongo-obtusum, apice hyalinum, 7-nerve, glabrum, laeve, 2–2.5 mm. longum ; palea nulla. *Anthoecium superius* hermaphroditum ; lemma oblongo-obtusum, 7-nerve, apice hyalinum, 2.5 mm. longum. *Stamina* 3 ; *antherae* 0.33–0.5 mm. longae ; *styli* duo ; *stigmata* plumosa. *Caryopsis* 1.25 mm. longa, fusiformis ; hilum lineare, 0.3 mm. longum.

Ind. Or. : Bombay, N. Kanara, Jog, Gersoppa Falls, 130 m., Oct. 1919, L. J. Sedgwick 7089 “pendulous from a wet rock” (Typus in Herb. Kew.) ; Gersoppa Falls, Oct. 1919, Hallberg et McCann s.n., “on rocks”.

This extremely delicate and graceful grass has only been collected in one place, namely, in the gorge where the Sharavati River tumbles over the high cliff at Jog in Western India on the boundary between the Bombay Presidency and Mysore State. It is described as growing on and pendulous from the wet rocks, doubtless kept moist by the dense mist cast up by this most impressive cataract, known as the Gersoppa Falls, where the water falls in four cascades over 300 m. in all, into the deep pool at the foot of the cliff.

The Sharavati River, which is not very long, is much swollen during the rainy months of the monsoon (June to October), but contracts rapidly at the onset of the dry cold weather, and in the hot dry months of the spring and early summer, which precede the monsoon, is a mere trickle of clear water. For most of the year, then, the rocks in close proximity to the waterfall are dry, and during a part of the year at least, exposed to direct insolation and tropical temperatures. Vegetation therefore which can exist in such a habitat must be quite exceptional.

While little is known about the conditions which *Hubbardia* has to tolerate, it can with safety be assumed that as an annual it passes the whole of its life between the beginning and the end of the monsoon. The extremely delicate texture of the leaves, for example, indicates that they could only exist in an atmosphere which is supersaturated, as the air in the neighbourhood of the falls certainly is. The clouds of mist and driving spray obviate the necessity for any special protective devices on the leaves to prevent excessive transpiration. In fact the leaf of *Hubbardia* is so thin as to suggest that gaseous exchange takes place directly with the outside world, from the upper and lower surfaces.

The systematic position of the grass presented some difficulties since nothing like the structure of the spikelet is to be found in any known genus of grasses. The structure, which in short, consists of two seven-nerved glumes enclosing two 7-nerved scales, the upper of which contains a hermaphrodite flower, is quite unique.

An investigation into those anatomical characters which are of use in the classification of the Graminae, revealed the following:—

1. The starch grains are compound.
2. The chlorenchyma of the leaves is evenly distributed in the tissue between the vascular bundles.
3. The hairs on the leaves are unicellular.
4. The silica cells are few in number and their outline, as seen from above, is more or less square with the four sides sometimes slightly concave.

With this data, combined with what we know of the structure of the spikelets—2-flowered, with awnless lemmas and articulation above the glumes—some progress can be made.

Actually it is quite clear that the grass cannot be placed in the *Panicoidae* (*Panicaceae*, *Andropogoneae*, *Maydeae*) because of the festucoid type of

Hubbardia heptaneuron Bor.

1 : habit. 2 : leaf and sheath. 3 : collar. 4 : raceme. 5 : spikelet. 6 : glume. 7 : lemma. 8 : ovary. 9 : caryopsis, (a) adaxial view, (b) abaxial view, (3) transverse section.

chlorophyll tissue in the leaves and the absence of 2-celled hairs on the epidermis. While the festucoid type of leaf anatomy is more or less typical of grasses which grow in temperate regions, it is also found in tropical grasses which live in habitats which are aquatic. Two such tribes are the *Oryzeae* and *Isachneae*.

It may be noted that the tribe *Isachneae* possess characteristics which enable *Hubbardia* to fit in without any undue straining. The anatomical characters of the tribe agree with those of *Hubbardia*, 7-nerved glumes are not unknown in *Isachne* (a 7-nerved lower glume is found in *Limnopoia*) the upper lemma is similar to the lower in a number of species, and finally a comparison of the silica cells of *Hubbardia* with those of one species of *Isachne* shows general agreement in outline:

The latest conception of the tribe *Isachneae* Benth. is that drawn up by C. E. Hubbard in Hooker's *Icones Plantarum* sub. tab. 3422. Before *Hubbardia* can be fitted into this tribe, the characters would have to be widened to accommodate genera in which the lower floret was neuter as well as male, and also provision would have to be made for the absence of paleae and lodicules. Widened by the inclusion of these minor details, the tribe *Isachneae* will accommodate the genus *Hubbardia* without any trouble.

This grass was first discovered when the Rev. Father H. Santapau, Rector of St. Xavier's College, Bombay, placed the grass collections of the late L. J. Sedgwick at the writer's disposal in 1950. There were two sheets of Sedgwick's no. 7089 in these collections, one of which has been made the type sheet and is at Kew, the isotype is in the Blatter Herbarium at Bombay. Two further gatherings of the same species came to light when Father Santapau sent some unnamed grasses from the Blatter Herbarium to Kew. These had been collected by Hallberg and McCann at the same place, Jog, Gersoppa Falls, in the same month and year as Sedgwick's collection. Fragments of these gatherings are also at Kew. We are grateful to Father Santapau for generously donating this material to the Herbarium of the Royal Gardens, Kew.

The generic name has been chosen in honour of my colleague, C. E. Hubbard, whose work on the *Gramineae* is so well known.

Field Marshal J. C. Smuts and Kew

Smuts' leading position as a statesman obscured the deep interest he took in natural vegetation and whilst in and out of office he supported and encouraged botanical research in all its branches including the establishment of the Botanical Survey of S. Africa and a National Herbarium. Whenever he could he paid a visit to Kew and became acquainted with those who had contributed to the later parts of the *Flora Capensis*. He led an expedition in which Dr. Hutchinson took part through Rhodesia and Lake Tanganyika which resulted in the addition of valuable material to the Kew collections. An account of the vegetation of Schoemanskloof in the Eastern Transvaal, by Smuts, appeared in the *Kew Bulletin* in 1933, and he presented to Kew a set of the specimens then collected. In the passing of the Field Marshall both African botany and Kew have lost a very great friend.

TROPICAL AFRICAN PLANTS : XXII*

RANUNCULACEAE.

Anemone thomsonii *Oliv.* This species was first described by D. Oliver in Journ. Linn. Soc. Bot. **21**, 397 (1885) from material collected on Kilimanjaro by *J. Thomson*. The type is in the Kew Herbarium. The species has since been collected from other mountains in southern Sudan, Uganda, Kenya, and Tanganyika. It is obviously variable in the depth and degree of cutting of the segments of the ternately segmented leaves. Ulbrich described a variety from the Aberdare Mountains and all specimens from this range that we have seen appear to belong to the same variety. Material, of several collectors, from Mt. Hanang in Tanganyika, has all very narrow ultimate segments giving the plant a notable appearance. This variation seems worthy of a varietal name. The remaining material we have not been able to sort out into such clear-cut varieties but acknowledge that it still shows a considerable range of variation. We suggest the following classification on the basis of available evidence.

A. thomsonii *Oliv.*

var. **thomsonii** foliorum segmentis cuneatim late ellipticis vel oblatis plus minusve valde lobatis vel segmentatis, lobis ultimis 1.5–5 mm. latis.

TANGANYIKA. Kilimanjaro, *J. Thomson* (in Herb. Kew.).

var. **friesiorum** *Ulbrich* foliorum segmentis cuneatim oblique ovato-ellipticis vel oblongo-ellipticis plus minusve valde lobatis, lobis ultimis (haud dentibus) 4–8 mm. latis.

KENYA. Aberdare, prope Sattima, ca. 3000 m. in campo, *R. E. et T. C. E. Fries* 2366. (In Herb. Uppsala, not seen).

var. **angustisecta** *Milne-Redhead et Turrill*, var. nov., foliorum segmentis valde dissectis ultimis linearibus 0.5–0.75 mm. latis.

TANGANYIKA. Mt. Hanang, 3360 m., 8.2.46, *P. J. Greenway* 7639 (holotype in Herb. Kew.).

Ranunculus keniensis *Milne-Redhead et Turrill*, sp. nov., a *R. aberdarico* Ulbr. sepalis reflexis praecipue distinguitur.

Herba perennis, caulibus plus minusve erectis usque ad 2.4 dm. longis saepissime 3–4-floris teretibus in parte inferiore pilis longis distinctis patulis instructis in parte superiore parce pilosis vel glabris. *Folia basalis* trifoliolata; petiolus 9–14 cm. longus, patule pilosus; petiolulus terminalis, 0.4–3.5 cm. longus; petioluli laterales fere nulli, usque ad 2.5 cm. longi; foliola late ovata vel oblata, plus minusve trilobata, grosse dentata, terminalia 2–2.5 cm. longa, 2.6–2.9 cm. lata, lateralia leviter minora, omnia utrinque adpresse pilosa, margine ciliata. *Flores* pauci, minores. *Sepala* reflexa, elongato-ovata, subobtusata, 4 mm. longa, in pagina abaxiale sparse pilosa, in pagina adaxiale glabra. *Petala* elongato-obovata, apice rotundata, usque ad 7 mm. longa, flava. *Stamina* parva, circiter 12–15. *Carpella* 15–20, ovata, 2 mm. longa, glabra, in stylum breviter vix hamosum contracta. *Achenia* pauca (? an semper), ovata, fere recta, vix hamosa, 4.5 mm. longa, glabra, haud tuberculata vel foveolata.

KENYA. Mt. Kenya, north-west face at base of Caesar's Seat, 3660m., *C. Gilbert Rogers* 615 (holotype in Herb. Kew.).

E. MILNE-REDHEAD AND W. B. TURRILL.

*Continued from K.B. 1950, 384 (1951).

Flora of the Cape Peninsula*—This book is the result of the joint labours of a number of botanists extending over a period of some fifteen years, and is the first comprehensive Flora of the Cape Peninsula to deal with the plants of this area under a separate cover. Previously, descriptions of the plants of the Peninsula were only to be found in the *Flora Capensis* and scattered through periodicals and other recent publications.

The work now published brings the descriptions of the plants of this region up to date. It includes 2622 species and 702 genera. The dicotyledons number 1713 in 459 genera, the monocotyledons 846 in 209 genera, the gymnosperms 6 in 3 genera and the pteridophytes 57 in 28 genera. The editors compare the numbers with those given in other works. For instance J. M. Black's *Flora of South Australia* includes 2468 species. The *London Catalogue of British Plants* (ed. 10) enumerates 2047 while Coste in his *Flore de France* gives 4354 species for France and Corsica together. When comparing these figures it should be borne in mind that the area of the Peninsula is approximately one sixth greater than that of the Isle of Wight.

A useful feature of the work is the provision of keys to the families, the genera and the species. It should, however, be noted that the keys have been prepared to assist only in the identification of the plants of the Cape Peninsula and are not to be regarded as applicable in a general way.

The descriptions are written in non-technical style and are original in that they are not taken from the works of earlier authors but are based on living material wherever this has been available. It seems a pity that references to the places of publication of species are not supplied. Synonyms are not given except where names differ from those used in the *Flora Capensis*.

The nomenclature is in accordance with the International Rules of Botanical Nomenclature as laid down at the International Botanical Congresses of 1930 and 1935. The Flora is arranged according to Engler's system as given in his *Syllabus der Pflanzenfamilien* and Engler and Prantl's *Die natürlichen Pflanzenfamilien*.

The work is provided with a glossary, and indexes to the popular and scientific names, and will be welcomed by all students of the flora of the Cape Peninsula.

H. S. MARSHALL.

*Flora of the Cape Peninsula. Edited by R. S. Adamson and T. M. Salter. Pp. xix + 889, map. Cape Town and Johannesburg: Juta and Co. Limited. 1950. Price 55/-.

Orchids and how to grow them*—This book is primarily intended for those amateurs who want to know and grow orchids. After opening with interesting chapters on the "Life Secrets of the Orchid" and "The Orchid Family" the author goes on to deal with the culture of these interesting plants and considers the questions of housing, potting, pests and diseases, growing orchids from seed, artificial feeding and gravel culture. There is also a chapter on hybrids followed by a list of orchid genera and species. It is unfortunate, however, that the accuracy of this list is marred by several spelling errors. The book contains a number of photographic illustrations, a coloured plate of *Laelio-cattleya Bergenfield* and is provided with a useful index. The price, however, seems rather excessive.

H. S. MARSHALL.

*Orchids and how to grow them. By Adelaide C. Willoughby. Pp. xii + 135, illus. New York and London: Geoffrey Cumberlege, Oxford University Press. 1950. Price 21/-.

THE ARACEAE OF TRINIDAD AND TOBAGO, B.W.I.*

N. W. SIMMONDS.

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I. *Introduction.*

The list that follows is based upon field studies in Trinidad and upon herbarium work at Trinidad and Kew. I am indebted to the Director of the Royal Botanic Gardens, Kew, for permission to work in the Herbarium ; and to Mr. N. Y. Sandwith for much assistance.

All the sheets that have been seen are cited here, the herbarium in which they are deposited being indicated by the appropriate initial, T or K.

II. *Keys.*

Key to Genera.

- | | | |
|--|----|----------------------|
| 1. Flowers hermaphrodite | 2 | |
| Flowers unisexual, female at base of spathe, male above | 6 | |
| 2. Perianth present, terrestrial or epiphytic, rarely climbers | 3 | |
| Perianth absent, climbers | 5 | |
| 3. Spathe flat, persistent, leaves entire | 4 | |
| Spathe embracing the spadix, leaves pinnatifid | | <i>Dracontium</i> |
| 4. Spathe lanceolate, white, 3 or more cm. broad | | <i>Spathiphyllum</i> |
| Spathe linear, green, purple or crimson, less than 3 cm. broad | | <i>Anthurium</i> |
| 5. Ovules 1-2 per ovary | | <i>Monstera</i> |
| Ovules numerous | | <i>Anepsias</i> |
| 6. Plants terrestrial (or epiphytic) or climbing | 7 | |
| Plants aquatic, floating | | <i>Pistia</i> |
| 7. Spadix with hairs between female and male flowers and with a flattened terminal appendage | | <i>Typhonium</i> |
| Spadix not as above | 8 | |
| 8. Root climbers with elongate stems | 9 | |
| Terrestrial plants, rarely epiphytic, if climbing, then with short, thick internodes | 10 | |
| 9. Leaves trisect | | <i>Syngonium</i> |
| Leaves not trisect | | <i>Philodendron</i> |
| 10. Leaves peltate | | <i>Caladium</i> |
| Leaves not peltate | 11 | |
| 11. Marsh plants with tall, woody, often spiny stems | | <i>Montrichardia</i> |
| Not as above | 12 | |

*See also "Notes on the biology of the *Araceae* of Trinidad," by N. W. Simmonds, in Journ. Ecol. 38, 277-291 (1950).

- | | |
|---|-------------------------------------|
| 12. Leaves lanceolate, usually yellow-flecked | <i>Dieffenbachia</i> |
| Leaves neither lanceolate nor yellow-flecked | 13 |
| 13. Leaves entire, cordate or sagittate | 14 |
| Leaves divided to 1/4 way or more | 15 |
| 14. Resinous herb with cordate leaves | <i>Philodendron (giganteum)</i> |
| Evil-smelling laticiferous herb with sagittate leaves | <i>Xanthosoma (jacquinii)</i> |
| 15. Stems tuberous, subterranean, leaves palmatisect | <i>Xanthosoma (helleborifolium)</i> |
| Stems stout, aerial not tuberous, leaves trifid, the lobes pinnatipartite | <i>Philodendron (fendleri)</i> |

Keys to Species.

Anthurium.

- | | |
|--|--------------------------|
| 1. Leaves lanceolate, oblanceolate or linear-lanceolate | 2 |
| Leaves cordate | <i>A. guildingii</i> |
| Leaves palmatisect | <i>A. pentaphyllum</i> |
| 2. Internodes long, a creeping epiphyte | <i>A. scandens</i> |
| Internodes short, rosette epiphytes | 3 |
| 3. Leaf blades up to 30 cm. in length, tapering into the petiole at base | 4 |
| Leaf blades commonly 60-100 cm. in length, variably rounded at base | 6 |
| 4. Spadix up to 4 cm. in length in flower or fruit | 5 |
| Spadix 7 cm. or more in length | <i>A. willdenowii</i> |
| 5. Leaves 5-6 times as long as broad | <i>A. scolopendrinum</i> |
| Leaves 10-20 times as long as broad | <i>A. gracile</i> |
| 6. Berries obovoid, white at base, purple at apex | <i>A. huegelii</i> |
| Berries ellipsoid, white | <i>A. acaule</i> |
| Berries ellipsoid, scarlet | <i>A. crassinervium</i> |

Monstera.

- | | |
|--|--------------------|
| 1. Plant slender, leaves entire, less than 15 cm. long | <i>M. obliqua</i> |
| Plant robust, leaves commonly fenestrate and more than 20 cm. long | 2 |
| 2. Wings of petiole spreading, ca. 5 mm. broad, fruit lacking irritant cells | <i>M. pertusa</i> |
| Wings of petiole erect, ca. 2-3 mm. broad, fruit with abundant irritant cells apically | <i>M. irritans</i> |

Dieffenbachia.

- | | |
|---|-------------------|
| 1. Leaves dark green above, pale green beneath | <i>D. seguine</i> |
| Leaves flecked above, glaucescent green beneath | <i>D. picta</i> |

Philodendron.

- | | | |
|--|------------------------|---|
| 1. Leaves entire, sometimes cordate | 2 | |
| Leaves trilobed, the lobes pinnatipartite | <i>P. fendleri</i> | |
| 2. Leaves ovate or lanceolate, petiole winged | 3 | |
| Leaves variously cordate or rounded at the base, petiole not winged | 4 | |
| 3. Leaves oblanceolate | <i>P. rudgeanum</i> | |
| Leaves ovate or ovate-lanceolate | <i>P. karstenianum</i> | |
| 4. Petioles flat above, convex beneath | <i>P. accrescens</i> | 5 |
| Petioles terete or subterete | | |
| 5. Petioles roughly warty | <i>P. rubens</i> | 6 |
| Petioles smooth | | |
| 6. Stems short, massive, unbranched, hardly climbing, clothed in the fibrous remains of petioles and prophylls | <i>P. giganteum</i> | 7 |
| Branched climbers with naked stems | | |
| 7. Leaves oblong, rounded at base, hardly cordate | <i>P. krugii</i> | |
| Leaves ovate- or broadly cordate with a deep, often overlapping sinus | | 8 |
| 8. Leaves nearly as broad as long, basal lobes smoothly rounded in outline | <i>P. scandens</i> | |
| Leaves about 1/2 as broad as long, basal lobes somewhat angular in outline | <i>P. latifolium</i> | |

Xanthosoma.

- | | |
|--|---------------------------|
| 1. Leaves cordate-sagittate, angular at corners of basal lobes | <i>X. jacquinii</i> |
| Leaves palmatisect | <i>X. helleborifolium</i> |

III. *List.*

2. **Spathiphyllum cannifolium** (*Dryand.*) *Schott*, Gen. Aroid. 1 (1858) t.1.

Engler in Engl. Pflzr. 4, 23 B (1905) 57.

Lockhart (K) ; Fendler 747 (K) ; Crueger, Herb. Trin. 2248 (T) ; Finlay, Herb. Trin. 1996, La Brea, 25.2.1866 (T) ; Dannouse, Maraval, 4.5.02 (T) ; Riley 216, Four Roads, 30.5.24 (K) ; Broadway 7082, Caura, 11.1.29 (K) ; Broadway, Quare River, 25.3.34 (K) ; Simmonds, Herb. Trin. 13872, Tairico Bay, 8.12.46 (T, K) ; Simmonds, Herb. Trin. 14063, El Tucuche-Naranja, 2.1.48 (T).

Trinidad.

General, in damp places and by lowland streams. *Herb. Trin.* 14063 came from montane forest at 2300', however.

Northern tropical South America, St. Vincent (*Herb. Forsyth* (K)). Very variable in size and vigour.

2. **Anthurium scandens** (*Aubl.*) *Engl.* in *Mart. Fl. Bras.* **3**, 2 (1878), 78.

Engler in *Engl. Pflzr.* 4, 23 B, (1905), 57.

Dannouse, Arima, 2.5.1899 (T); Broadway 3951, Maraval, 12.1.11 (K); Broadway, *Herb. Trin.* 9925, Heights of Aripo, 10-26.1.22 (T); Broadway 6226, Oropuche local road, 7.5.26 (K); Broadway 6283, Las Lapas road, 5.2.26 (K); Simmonds, *Herb. Trin.* 14122, Brazil to Talparo, 25.1.48 (T, K); Simmonds, *Herb. Trin.* 14170, 9th mile of Cumaca road, 1.2.48 (T, K); Simmonds, *Herb. Trin.* 14231, Oropuche local road, 27.12.48 (T); Ayliffe, *Herb. Trin.* 14266, Arima-Blanchisseuse rd., 1948 (T).

Trinidad.

A creeping epiphyte recorded only in the north and centre of Trinidad, light-demanding and characteristic of cultivated trees such as cacao.

Tropical South and Central America and Greater Antilles.

Engler (*loc. cit.*) distinguishes six varieties of which *Broadway* 6226 seems to represent var. *leucocarpum* (Schott) Engl.

3. **Anthurium scolopendriaum** (*Ham.*) *Kunth*, *Enum. Pl.* **3** (1841), 68.

Engler in *Engl. Pflzr.* 4, 23 B (1905), 89.

A. gracile (Rudge) *Lindl. Bot. Reg.* 19, t. 1635 (1833), *quoad tab.*

Fendler 748 (K); Ryan (in *Herb. Vahl.*, *ex* Engler); Broadway 4174, Maraval, 13.2.11 (K); Broadway 9374, Quare river, 1.2.34 (K); Simmonds, *Herb. Trin.* 13887, St. Augustine, 7.10.47 (T).

Trinidad.

Recorded only from northern districts.

Tropical northern South and Central America (the typical plant).

Very near to (and doubtfully distinct from ?) *A. gracile* from which it differs in the lanceolate leaves, down to 5 times as long as broad, to 5 cm. in width, the lateral veins making an angle of about 60° with the mid-vein.

4. **Anthurium gracile** (Rudge) *Lindl. Bot. Reg.* **19**, t. 1635 (1833), *quoad nomen*; Engler in *Engl. Bot. Jb.*, 25 (1898), 370; Engler in *Engl. Pflzr.* 4, 23 B (1905), 89.

Fendler 748 B (K); Crueger, *Herb. Trin.* 2243, 19.4.1847 (T); Broadway, *Herb. Trin.* 3790, Royal Botanic Gardens, 8.5.1889 (T); Britton, Freeman and Nowell 2577, Tabaquite, 26-8.3.21 (K); Hombersley 725-25 (K); Simmonds, *Herb. Trin.* 13886, Heights of Aripo, 9.2.47 (T, K).

Trinidad.

Recorded only from northern and central districts.

Tropical northern South and Central America.

Differs from *A. scolopendrinum* in the leaves linear-lanceolate, 10–20 times as long as broad, the lateral veins making an angle of about 45° with the mid-vein.

Hombersley 725–25 appears to be a dwarf form of this species.

5. ***Anthurium willdenovii*** *Kunth sensu* Schott ; Kunth, Enum. Pl. 3 (1841), 71 ; Schott, Prodr. (1860), 479 ; Engler in Engl. Pflzr. 4, 23 B (1905), 150.

Broadway 4496, Caledonia Lot 42, Tobago, on trees, 21.4.13 (K).

Tobago.

St. Lucia and Tobago.

Kunth based the species on a Willdenow plant which I have not seen. Schott took up the name and cited Forsyth, St. Lucia, which collection in Herb. Kew. (labelled “ St. Lucia, Anderson, Herb. Forsyth purchased 1835 ”) matches the Broadway sheet quite well. However, Engler gives south Brazil for distribution and his cited sheets in Herb. Kew. (*Glaziou* 9026, 17335 etc.) do not match the Broadway collection. Probably two species are involved.

6. ***Anthurium huegelii*** *Schott*, Prodr. (1860), 469.

A. trinitatis Engler in Engl. Pflzr. 4, 23 B (1905), 73.

Engler in Engl. Pflzr. 4, 23 B (1905), 71, *sub A. hookeri* Kunth.

Fendler 733 (K) ; Fendler 741 (K) (type of *A. trinitatis* Engler.) ; Hart, Herb. Trin. 5542, “ Hort. Trin. and common ”, July 1894 (T) ; Broadway, Herb. Trin. 7621, Moruga, 9.2.16 (T) ; Williams, *sine num.* Monos, Oct. 1917 (T) ; Britton and Britton 2101, Valencia, 4.3.21 (K) ; Simmonds, Herb. Trin. 13882, Piedra blanca, 12.1.47 (T, K) ; Simmonds, Herb. Trin. 13883, Gasparee, 7.4.47 (T) ; Simmonds, Herb. Trin. 13884, Gasparee, 2.7.47 (T, K).

Trinidad.

General, epiphytic on trees in the moister districts, saxicolous in the drier.

West Indies, Trinidad to Dominica.

I follow Brown (Gard. Chron. 48 (1910) 153) in separating this species from *Anthurium hookeri* Kunth from British Guiana which has a rather characteristic short, relatively broad and blunt spadix. *A. trinitatis* Engler differs from this species only in inconstant details of nervation. This is the common Trinidad species, but either of the two following might possibly be represented by some of the sheets cited above, so great are the difficulties of herbarium identification in this group.

7. ***Anthurium acaule*** (*Jacq.*) *Schott*, Melet., 1 (1832), 22.

Engler in Engl. Pflzr. 4, 23 B (1905), 69.

Putney Hill, Great Dog River, Tobago, Eggers (*ex* Engler), the only record.

Tobago.

West Indies, Puerto Rico to Tobago.

An ill-understood species nearly related to the preceding. According to Engler it may be distinguished by the prominence of the lateral nerves of 2nd and 3rd orders and this seems to be true of sheets in Herb. Kew. cited by him. Brown (Gard. Chron. **48** (1910) 153), however, ignores this point and states that the berries of *A. huegelii* are globose, white below, and purple at the apex while those of *A. acaule* are pear-shaped and white. Schott (Prodr. Aroid. (1860), 476) states that the berries are red and this statement was taken up but finally dropped by Engler. These difficulties can probably be resolved only by intensive field collection and monographic treatment.

8. ***Anthurium crassinervium*** (Jacq.) Schott, Melet., **1** (1832), 22. Engler in Engl. Pflzr. 4, 23 B (1905), 76.

King's Bay, Tobago, Seitz 97 (*ex* Engler), the only record.

Tobago.

Tobago, Venezuela, Colombia, Panama.

Differs from the two preceding species, apparently, in the prominent primary lateral veins, the ovoid red berries and (according to Engler) the tepals which are broader than long. Schott's figures (Icon., 1857, t. 12-14) are magnificent; a very similar plant of unknown provenance which grows in the Aroid House at Kew is doubtless this species.

9. ***Anthurium guildingii*** Schott in Oest. Bot. Wochenbl. (1857), 301.

Anthurium aripoense N. E. Brown in Bull. Torr. Bot. Cl., 51 (1924), 4.

Engler in Engl. Pflzr. 4, 23 B (1905), 178.

Broadway, Herb. Trin. 5230, Tucuche, 27.2.1893 (T); Herb. Trin. 6848, Botanic Gardens, 1906 (T); Broadway 7130, Heights of Aripo, 9.3.29 (K); Broadway, Herb. Trin. 9924, Heights of Aripo, near summit of mountain, 10-26.1.22 (type of *A. aripoense* N. E. Br.) (T, K); Simmonds, Herb. Trin. 13889, Piedra blanca, 12.1.47 (T, K); Simmonds, Herb. Trin. 13888, El Tucuche, summit, 5.6.47 (T, K).

Trinidad.

Terrestrial and climbing in the forested heights of the northern mountain range only.

West Indies, Dominica to Trinidad.

An extremely variable species, and the specimens cited differ considerably in shape and size of the sinus and basal lobes, development of a constriction above the basal lobes, texture, thickness and colour of the leaves and size of the inflorescence. *A. aripoense* is merely one of the many forms. The species normally grows on the ground or climbs a little in deep shade in montane forest at 2500' or more in the Northern Range; the thick, pale leaf of Herb. Trin. 13888 from El Tucuche probably results from growth in an exposed habitat on the open, cleared top of this mountain.

10. ***Anthurium pentaphyllum*** (Aubl.) G. Don in Sweet, Hort. Brit., ed. 3 (1834), 633.

Engler in Engl. Pflzr. 4, 23 B (1905), 290.

Finlay, Herb. Trin. 2897, Irois, 24.4.1868 (T); Fendler 743 (K);

Tobago, G. L. Meyer 16, Bannock Burn, Delaford Woods, 28.7.1879 (K) ; Dannouse, Herb. Trin. 6751, Maracas Bay (T, K) ; Broadway, Herb. Trin. 7805, Mount Tamana, 16.2.15 (T) ; Freeman, Herb. Trin. 9066, Tamana, 18.4.20 (T) ; Britton, Britton and Hazen 1941, Mt. Tamana, 18.4.20 (K) ; Freeman and Williams, Herb. Trin. 11411, Point opposite Melville Islands, Tobago, 25.10.25 (T) ; Broadway, *sine num.*, Tamana, 27.3.25 (K) ; Simmonds, Herb. Trin. 13885, Gasparillo-Maracas trail, 13.4.47 (T) ; Simmonds, Herb. Trin. 13871, Mt. Aripo, 4.5.47 (juvenile) (T) ; Simmonds, Herb. Trin. 14062, Aripo, 24.12.47 (T) ; Simmonds, Herb. Trin. 14197, Cap de Ville, 29.2.48 (T) ; Simmonds, Herb. Trin. 14219, Naranja-Piedra blanca, 18.4.48 (juvenile) (T) ; Simmonds, Herb. Trin. 14384, Guaico-Valencia Reserve, 8.6.49 (T).

Trinidad and Tobago.

General, climbing in forest (an unusual habit in *Anthurium*).

Tropical South America.

The juvenile leaves are sagittate, not palmati-compound. It is a curious fact that this species which, though widely distributed in the island, is not common, is one of the best-collected of all the Trinidadian aroids.

Engler, l.c. 290, records *A. digitatum* (Jacq.) D. Don from Tobago, citing Eggers 5509 and 5776, from the Great Dog River valley. I have not seen specimens of these numbers, but suspect that the material should be referred to *A. pentaphyllum*.

11. *Anepsias moritzianus* Schott, Gen. Aroid. (1858), 73.

Engler and Krause in Engl. Pflzr. 4, 23 B (1908), 96.

Standley in Woodson and Schery, Fl. Panama, 2, 3 (1943), 46.

Simmonds, Herb. Trin. 13881, coll. between Piedra blanca and Naranja, 23.2.47 and 13.7.47 (T) ; Simmonds, Herb. Trin. 14352, Piedra blanca, 12.5.49 (sterile) (T, K).

Trinidad.

An extremely rare species, known only from one tree in forest at c. 1900' in the Northern Range.

Venezuela, Panama and Costa Rica.

I have seen no authentic specimens. One Trinidad collection is in fruit in which it was impossible to verify the critical generic character concerned with septation. However, the present specimen matches Schott's description and figures (Gen. Aroid. (1858) t. 73) well and is doubtless correctly determined. A handsome, high-climbing species, the sharply broadened leaf base, slender channelled petiole and dark greyish-green metallic sheen on the leaves are very characteristic.

12. *Monstera pertusa* (L.) de Vriese, Hort. Sparm. Bergens (1839), 40.

Engler and Krause in Engl. Pflzr. 4, 23 B (1908), 103.

Fendler 735 (K) ; Eggers 5608, Tobago (*ex* Engler, *loc. cit.* as var. *jacquinii* (Schott) Engl.) ; Broadway and Urich, Herb. Trin. 4771, Debe valley, 26.8.1892 ; Sandwith 1711, Easterfield road, Tobago, 11.10.37

(K) ; Simmonds, Herb. Trin. 13861, Mt. St. Benedict, 17.12.46 (T, K) ; Simmonds, Herb. Trin. 13863, Diego Martin, 10.7.47 (T).

Trinidad and Tobago.

General and common, especially on cultivated trees (e.g. the immortelles of cacao plantations) and at forest margins.

Tropical South and Central America and West Indies northwards to Dominica.

A very variable species ; I have not attempted varietal determinations.

13. ***Monstera obliqua*** (Miq.) Walp. Ann. (1849), 761 ; Engler and Krause in Engl. Pflzr. 4, 23 B (1908), 103.

M. fendleri Engler in Engl. Bot. Jb., 37 (1905), 116.

Fendler 736 (K) (type of *M. fendleri* Engl.) ; Cruieger (?), Cocorite, 5.10.1846 (T) ; Cruieger (?), Caroni Woods, 14.2.1847 (T) ; Broadway, Herb. Trin. 7354, Los Bajos, Erin, 12.11.15 (T) ; Britton, Freeman and Nowell 2603 (=Herb. Trin. 10523), forest, vicinity of Tabaquite, 26-8.3.21 (T, K) ; Williams, Freeman and Cheesman, Herb. Trin. 11250, road to Maracas Bay, 10.7.25 (T) ; Sandwith 1798, Back Hill above Charlotteville, Tobago, 16.10.37 (K) ; Simmonds, Herb. Trin. 13862, Heights of Aripo, 9.2.47 (T, K) ; Simmonds, Herb. Trin. 13864, Piarco Savanna, 3.8.47 (T) ; Simmonds, Herb. Trin. 14021, Mt. Aripo, 24.12.47 (T).

Trinidad and Tobago.

General, but much less common than the preceding.

Guiana, Brazil, Bolivia.

14. ***Monstera irritans*** Simmonds, sp. nov.

Scandens ; lamina folii plantae juvenulae ovato-cordata, inaequilatera, adultae oblongo-ovata, venis infra patentibus ; foramina nulla vel paucissima ; petioli graciles, supra medio sulcati, leviter alati ; pulvinus subteres ; spatha mucronata, decidua, testaceo-brunnea ; spadix cylindricus, basin versus attenuatus, apice rotundatus ; baccae uni-spermae apice cellulis crebris irritantibus instructae.

Plant climbing. *Juvenile shoots* slender, closely applied to the support ; internodes about 2 cm. long ; leaves asymmetrically ovate-cordate, sinus small, 5 mm. deep, usually closed, lobes rounded, apex rounded-mucronate, dark green with greyish-white interveinal flecks, from 3×2 cm., increasing gradually in size and changing form as the stem climbs. *Mature internodes* 2-7 cm. long, 8-9 mm. thick, covered with a scaling periderm in dried material. *Petioles* 20-30 cm. long, 3-4 mm. broad, channelled above and slightly winged, broadened to a clasping base below and including a slender unchannelled pulvinus 1-3 cm. long above. *Blades* not or slightly fenestrate, asymmetrically oblong-ovate, up to 40×20 cm., subacute at the apex, rounded retuse at the base, commonly tearing along the veins on drying ; main lateral veins 8-10, making an angle of about 45° with the costa, slightly prominent beneath (in dried material), the costa itself very prominent, 2 mm. broad. *Spadicis* solitary, on peduncles 6-8 cm. long and 3 mm. broad in the middle, thicker at the ends. *Spathe* pale brown before anthesis, shortly mucronate,

the surface dull and smooth, deciduous in young fruit. *Flowering spadices* cylindrical, slightly tapered at the base, rounded and untapered at the apex, 6.5×1.5 cm. *Flowers* 2–3 mm. broad, 4–5 mm. deep, sub-hexagonal in section, densely packed; stigma (in dried material) a dark brown raised line ca. 1 mm. long. *Fruiting spadices* massive, cylindrical, 10×2.5 to 13×3.3 cm., tapered at the base (basal flowers commonly sterile), rounded at the apex, green when immature, brownish-orange later. *Fruits* 10–13 mm. long, 5 mm. broad, the basal $2/3$ occupied by the solitary seed, the apical $1/3$ containing a white mass of long, slender, pointed, irritant cells, oriented longitudinally with respect to the axis of the fruit and surrounding a small, persistent styler cavity. *Seeds* about 8×5 mm., with a thin, smooth, leathery testa.

Broadway, Herb. Trin. 5388, Botanic Gardens, 1.9.1893 (T) (sterile, a series of juvenile and mature leaves); Freeman, Herb. Trin. 8096, Grande Riviere, 1913 (T) (juvenile); McLean, Herb. Trin. 7724, Diego Martin, 13.5.15 (T) (juvenile); Broadway *sine num.*, Tabaquite, 4.10.18 (K) (juvenile); Broadway *sine num.*, Maraval, 5.3.26 (K) (juvenile); Britton and Broadway 2813, Siparia Quarry, (K) (juvenile); Simmonds, Herb. Trin. 13880, nr. Sangre Grande, 13.6.47 (T) (juvenile); Simmonds, Herb. Trin. 13879, Sans Souci, 17.9.47 (T) (sterile, mature); Simmonds, Herb. Trin. 13878, San Juan Estate, Montserrat, 1.10.47 (T) (fruit); Simmonds, Herb. Trin. 14196, Cap de Ville, 29.2.48 (T, type) (flower).

Trinidad; endemic so far as known. See Journ. Ecol. 38, 290 (1950).

Generally distributed and locally common. It sometimes attains great size and vigour but is present in many localities as the sterile juvenile form only, whose obliquely-cordate, mottled leaves have a very characteristic appearance. Even when mature foliage is found, flowers are rare and tend to be formed high up and out of reach. The broad, untapered fruiting spadix is unlike that of any other *Monstera* I have seen. The species is named for the irritant cells formed abundantly in the apex of the gynoeceia as the fruits ripen. *Jenman* 5765, Rupununi River, British Guiana, Oct. 1889 (K) (with immature and mature foliage but no flowers), might be the same.

15. **Montrichardia arborescens** (L.) Schott, Araceen Betreff. 1 (1854), 4.

Engler in Engl. Pflzr. 4, 23 C (1911), 124.

Crueger (?) without locality or date (T); Finlay, Herb. Trin. 1991, Cocorite, Jan. 1866 (T); Eggers 5890, Lambeau River, Tobago, Nov. 1889 (K); Alexander, Herb. Trin. 4564, 1891 (T); Broadway, Herb. Trin. 5087, Caroni River, 2.1.1893 (T); Alexander, Herb. Trin. 6860, "Toucoute" (?), 1898 (T); Dannouse, Arima, Nov. 1904 (T); Hart, Gov't House gardens, March 1908 (T); Tredholm, Cocorite, 12.9.06 (T); Fielden, Government House, 22.6.10 (T); King, Herb. Trin. 7130, Cedros, 21.9.15 (T); Britton, Point Cumana, 20.3.21 (T); Simmonds, Herb. Trin. 13867, Sans Souci, 3.1.47 (T); Simmonds, Herb. Trin. 13868, Maracas bay, 30.3.47 (T, K).

Trinidad and Tobago.

Locally abundant in saline coastal marshes and at the mouths of rivers.

Tropical northern South and Central America, and West Indies from Martinique to Trinidad.

The var. *aculeata* (Meyer) Engl. differs from the typical plant in its greater height, spiny stems, rough petioles and the veins more exposed in the sinus. Field work in Grenada, B.W.I., suggested that the variety is a good one though there is little difference in size, and there is intergradation of spininess. A distinction is not normally possible in the herbarium, however. It is possible that an ecological difference exists, the typical form preferring freshwater sites, the var. *aculeata* saline or at least brackish water; and it is desirable that this point should be observed by collectors. I have only seen the species in coastal localities in Trinidad, but several of the sheets cited above are evidently from inland.

16. **Dieffenbachia** cf. **seguine** (Jacq.) Schott, Melet., 1 (1832), 20.

Engler in Engl. Pflzr. 4, 23 DC (1915), 45.

Fendler 739 (K).

Trinidad.

Tropical South and Central America and West Indies.

A variable species, understanding of which is confused by the numerous cultivated forms. Fendler 739 does not match any specimen in Herb. Kew. really satisfactorily but is probably this species.

17. **Dieffenbachia** cf. **picta** (Lodd.) Schott in Oest. Bot. Wochenbl. (1852), 68.

Engler in Engl. Pflzr. 4, 23 DC (1915), 48.

Simmonds, Herb. Trin. 13869, Heights of Aripo, 9.2.47 (T, K);
Simmonds, Herb. Trin. 13870, Arena Forest Reserve, 24.4.47 (T);
Simmonds, Herb. Trin. 14386, Guaico-Valencia Reserve, 8.6.49 (T).

Trinidad.

Generally distributed and locally abundant in damp, shady, lowland localities.

Northeastern tropical South America.

Flowering is very rare and represented only by Herb. Trin. 14386.

18. **Dracontium foecundum** Hook. f., Bot. Mag. (1885), t. 6808.

Engler in Engl. Pflzr. 4, 23 C (1911), 42.

Broadway 9214, Buenos Aires, Erin, 22.2.33 (K).

Trinidad.

Rare; in the south-western peninsula only.

British Guiana.

19. **Xanthosoma jacquinii** Schott, Melet. 1 (1832), 19. Wild Tannia.

Engler and Krause in Engl. Pflzr. 4, 23 E (1920), 47.

Broadway 4433, Englishman's Bay, Tobago, 15.11.1912 (K);
Broadway, 13.1.1915 (T); Broadway, Herb. Trin. 7841, Royal Botanic
Gardens, 15.2.1915 (T); Britton and Britton 2208, Matchepoorie,
11.3.21 (K); Broadway 5562, Maracas Falls, 27.2.25 (K), Sandwith

1901, Parlatuvier, Tobago, 24.10.37 (K) ; Simmonds, Herb. Trin. 13873, Maracas Valley, 27.12.46 (T, K) ; Simmonds, Herb. Trin. 13874, Heights of Aripo, 9.2.47 (T).

Trinidad and Tobago.

General, and common in damp shaded ravines and forest.

Tropical northern South and Central America and West Indies north to Puerto Rico.

This is a good wild species with massive, fleshy sprawling stems up to 10 feet in length, and is never cultivated. Indeed, local tradition has it that the plant is poisonous, but Engler and Krause state that it is widely cultivated. Probably *X. sagittifolium* (L.) Schott and *X. violaceum* Schott have been confused here. The greyish latex and evil odour are diagnostic.

20. **Xanthosoma helleborifolium** (Jacq.) Schott in Oest. Bot. Zeitschr. 15 (1865), 33.

Engler and Krause in Engl. Pflzr. 4, 23 E (1920), 61.

Fendler 737 (K) ; Finlay, Herb. Trin. 1994, 4.6.1865 (T) ; Broadway, Herb. Trin. 10166, Royal Botanic Gardens, 26.7.22 (T) ; Broadway 6340, Tabaquite-Rio Claro road, 19.7.26 (K) ; Simmonds, Herb. Trin. 13875, Caurita Valley, 13.7.47 (T) ; Simmonds, Herb. Trin. 13876, St. Augustine, 15.8.47 (T, K).

Trinidad.

General though not common ; a weed of cultivation.

Tropical northern South and Central America and West Indies.

21. **Caladium bicolor** (Ait.) Vent. Jard. Cels., t. 30.

Engler and Krause in Engl. Pflzr. 4, 23 E (1920), 31.

Broadway, Herb. Trin. 8227, Royal Botanic Gardens, 24.6.16 (T) ; Broadway 6315, St. Augustine, 23.6.26 ; Simmonds, Herb. Trin. 13865, St. Augustine, 4.6.47 (T) ; Simmonds, Herb. Trin. 13866, St. Augustine, 23.6.47 (T, K).

Trinidad.

Locally very common as a weed of cultivation and probably much more widespread than the sheets suggest.

Tropical South America and West Indies.

Leaves green or spotted red at the insertion of the petiole ; rarely more strongly pigmented except in cultivation as an ornamental. The leaves die back in the dry season and spring with the first rains ; flowering comes about a month later but fruit has never been seen to set in Trinidad.

22. **Philodendron giganteum** Schott, Syn. (1856), 89.

Engler and Krause in Engl. Pflzr. 4, 23 DB (1913), 59.

Crueger, Herb. Trin. 1800, Arima (T) ; Broadway 4539, Mason Hall, Tobago, 20.5.13 (K) ; Broadway 6596, Arima-Blanchisseuse Rd., 25.3.27 (K) ; Simmonds, Herb. Trin. 13892, Maracas, 8.12.46 (T) ; Simmonds, Herb. Trin. 13894, El Cerro de Maracas y las Cuevas, 13.4.47 (T) ; Simmonds, Herb. Trin. 13895, Piedra blanca-Naranja, 23.2.47 (T, K).

Trinidad and Tobago.

Common and general in forest, terrestrial and climbing.

West Indies.

Fendler 740, cited by Engler and Krause as this species, is *P. accrescens*. *Broadway* 4539 has been determined as *P. simsii* Kunth ; this is a nearly-related species to which *P. giganteum* might ultimately have to be reduced.

23. ***Philodendron fendleri*** Krause in Engl. Pflzr. 4, 23 DB (1913), 118.

Fendler 745 (K, type) ; *Broadway*, Herb. Trin. 4409, Botanic Gardens, Nov. 1890 (T) ; *Hart*, Herb. Trin. 4987, Botanic Gardens, 1892 (T) ; *Broadway* 1912, Government House, 7.11.07 (K) ;* *Broadway*, Government House, 23.10.11 (K) ; *Britton* and *Britton* 2090, Valencia, 4.3.21 (T) ; *Simmonds*, Herb. Trin. 13893, Sans Souci-Grande Rivière, 3.1.47 (T, K).

Trinidad.

General , terrestrial or climbing in forest.

Endemic, so far as is known.

24. ***Philodendron rubens*** Schott, Syn. (1856), 84.

P. tobagense Engler in Engl. Bot. Jb. 27, (1899), 524.

Engler and Krause in Engl. Pflzr. 4, 23 DB (1913), 52 and 61.

Fendler 734 (K) ; *Hort. Kew.*, June 12, 1878, from *Crueger* (K) (juvenile form) ; *Broadway* 4493, Caledonia Lot 42, Tobago, 28.4.13 (K) ; *Broadway*, Herb. Trin. 7849, Siparia, 13.3.15 (T) ; *Britton*, *Britton* and *Freeman* 2130, Brazil (K) ; *Williams* and *Cheesman*, Herb. Trin. 10794, Arima, 25.9.24 (T) ; *Broadway* 5984, junction of Blanchisseuse and Las Lapas roads, 26.2.6. (K) ; *Broadway* 6213, Morne Bleu, 16.5.26 (K) (juvenile) ; *Simmonds*, Herb. Trin. 13901, Piedra blanca-Naranja, 23.2.47 (T, K).

Trinidad and Tobago.

General in forests.

Venezuela.

This species has, apparently, been known only from garden specimens from Venezuela (Schott) and Trinidad (Crueger). *Fendler* 734 cited by Engler and Krause (*loc. cit.* p. 52) as *P. tobagense*, however, belongs here and I have no hesitation in reducing the latter species. The warty petioles are characteristic and in this it agrees with the evidently nearly related *P. asperatum* C. Koch.

25. ***Philodendron accrescens*** *Simmonds*, sp. nov.

Scandens ; internodia stirpis junioris tenuia ; lamina folii plantae juvenulae ovata et petiolus alatus ; hic adultae supra planus infra convexo-rotundatus, illa cordata leviterque basi excisa sinu aperto. Spatha apicem versus attenuata summo apice acuminata ; spathae tubus intus sanguineus. Ovaria 6-7-locularia, loculis multiovulatis, ovulis amphitropis ; baccae carnosae, coccineae.

Plant climbing, resinous. Juvenile stems with slender internodes about 8 cm. long, and ovate-lanceolate leaves, 15×6 cm. or less, up to 25×12 cm., broadest below the middle, acuminate; petiole winged nearly to the top. *Older stems* with internodes 1 cm. long, 2 cm. thick, clothed in the persistent fibrous remains of petioles and prophylls. *Petioles* up to 50 cm. long, 1.5 cm. broad, winged only at the extreme base, flat above, the margins slightly raised, convex beneath, smooth, flushed reddish-purple at junction with lamina and tending to break at this point in dried material. *Leaf blades* smooth and shiny, cordate, the lobes rounded, the apex shortly acuminate, up to 43×34 cm., the margin wavy; sinus broad and open 8, cm. deep; main lateral veins about 14, slightly prominent beneath, clustered and spreading but not exposed at the sinus, 2.5 cm. apart apically and pointing forwards. *Spadices* solitary on peduncles 6 cm. long, 4 mm. thick at base, thickening to 10–12 mm. distally, pink below, whitish above at junction with spathe. *Spathe* thick, fleshy, persistent, brittle, 10–12 cm. long, the tube crimson, the tapering, acuminate blade greenish flushed with pink dorsally, later white. *Axis of spadix* tapered, 8–9 cm. long, 8 mm. broad, female flowers inserted upon the basal 3 cm., sterile flowers upon the adjacent 1 cm., male flowers upon the apical 4–5 cm. Male flowers 0.5 mm. in diameter, sterile flowers about 1 mm., all, with the axis that bears them, rotting off in advanced fruit. Female flowers white, 2 mm. broad, 3 mm. deep, with a pale reddish stigmatic disc; ovaries 6–7-locular, with numerous, stalked, axile, amphitropous ovules. *Infructescence* ovoid, 7×4.5 cm. *Fruits* 6×4 mm., scarlet, fleshy, with numerous, minute, whitish seeds.

Fendler 740 (K); Simmonds, Herb. Trin. 13890, Long Stretch, 26.12.46 (T); Simmonds, Herb. Trin. 13891, head of Caura Valley, 9.3.47 (T, K); Simmonds, Herb. Trin. 14256, Long Stretch, 15.1.49 (T, type).

Trinidad.

Locally common in wet forests in the northern parts of the island.

Endemic. For notes on distr. see Journ. Ecol. 38, 289 (1950).

Fendler 740 was determined by Krause as *P. giganteum* but clearly belongs here. The petiole plano-convex in section is very characteristic, as also is the habit of climbing with slender stems bearing juvenile leaves (*Herb. Trin.* 13891 (T)), the internodes shortening and thickening greatly at flowering. The description and figures are based on all Herb. Trin. specimens, together with the relevant field notes and on notes of fruit characters made on an unpreserved gathering from Cleaver Wood, Arima, 25.10.47.

26. ***Philodendron krugii*** Engler in Engl. Bot. Jb., 26 (1899), 538.

Engler and Krause in Engl. Pflzr. 4, 23 DB (1913), 85.

McLean, Herb. Trin. 6383, Diego Martin (T); Britton and Broadway 2816, Siparia, 8.4.21 (T, K); Broadway 6266, Oropuche local road, Valencia 7.5.26 (K); Broadway 6964, Maracas, road to Waterfall, 1.6.28 (K); Simmonds, Herb. Trin. 13900, Gasparillo–Maracas trail, 13.4.47 (T, K); Simmonds, Herb. Trin. 13899, Arena forest reserve, 24.4.47 (T, K); Simmonds, Herb. Trin. 14385, forest, Matura–Valencia, 8.6.49 (T, K).

Trinidad and Tobago.

General, in forest.

Endemic.

Seitz 85 (Tobago) and *Eggers* 5765 (Tobago) are cited by Engler and Krause ; I have seen no authentic material.

27. ***Philodendron rudgeanum*** Schott, Syn. (1856), 78.

P. cannifolium (Rudge) Engl., non *P. cannifolium* Mart.

Engler and Krause in Engl. Pflzr. 4, 23 DB (1913), 6.

Fendler 744 (K) ; Dannouse, Laventille, 15.5.02 (T) ; Dannouse, Arima, 1.2.09 (T) ; Broadway 5770, Brazil via Guanapo, 4.9.25 (K).

Trinidad.

Guianas.

28. ***Philodendron latifolium*** C. Koch, Ind. Sem. Hort. Berol. (1855) App. 3.

Engler and Krause in Engl. Pflzr. 4, 23 DB (1913), 81.

Fendler 746 (K) (juvenile) ; Broadway 4504, Mason Hall, Tobago, 6.5.13 (K) ; Swabey, Herb. Trin. 12907, Salybia Bay, 3.6.33 (T) ; Simmonds, Herb. Trin. 13896, Galera point, 1.1.47 (T, K) ; Simmonds, Herb. Trin. 13902, Arima to San Rafael, 7.9.47 (T).

Trinidad and Tobago.

Common throughout the island except in the driest parts ; in forest, second growth and on cultivated trees.

Venezuela.

I have seen only N. E. Brown's notes and tracings in Herb. Kew., but make the determination with some confidence, nevertheless.

29. ***Philodendron scandens*** C. Koch et H. Sello, Ind. Sem. Hort. Berol. (1853), App. 14.

P. oxycardium Schott, Syn. (1856), 82.

Engler and Krause in Engl. Pflzr. 4, 23 DB (1913), 56.

Crueger, Herb. Trin. 5907, Tucuche, 3.2.1857 (T) (juvenile) ; Broadway, Moruga road, 9.7.19 (T) (juvenile) ; Britton, Seaver, van Ingen and Broadway, 8.4.21 (T) ; Simmonds, Herb. Trin. 13897, Piedra blanca-Naranja, 23.2.47 (T, K) (juvenile) ; Simmonds, Herb. Trin. 13898, Arima-Blanchisseuse road, 20.4.47 (T, K) (juvenile and mature but sterile) ; Simmonds, Herb. Trin. 13903, Arima-Blanchisseuse road, 17.8.47 (T, K) (in flower and fruit) ; Simmonds, Herb. Trin. 14349, Rio Claro-Mayaro road, 15.4.49 (T) (flower).

Trinidad.

General, in the wetter parts of the island and locally abundant at forest borders and in cacao fields.

Guatemala (*ex* Engl. and Krause), Venezuela (*ex* Schott), and West Indies.

P. scandens (of which flowers have never been described) is the juvenile form of *P. oxycardium* but, as a name, has priority. The species very rarely

flowers although it is locally abundant. *Simmonds*, Mt. St. Catharine, Grenada, B.W.I., 1.9.47 (K), seems to be a new record for the island.

30. ***Philodendron karstenianum*** Schott, Syn. (1856), 78.

P. broadwayi N. E. Brown in Kew Bull. (1912), 343.

Engler and Krause in Engl. Pflzr. 4, 23 DB (1913), 15, 19.

Broadway 3880, Englishman's Bay, Tobago, 10.7.12 (K) (type of *P. broadwayi* N. E. Br.) ; Broadway, Caledonia, Tobago, 13.6.13 (K) ; Broadway, Herb. Trin. 7167, Cedros, 29.9.15 (T) ; McLean, Herb. Trin. 7747, Blue Basin, 13.5.15 (T) (juvenile) ; Broadway 5442, Quare River forests, Valencia, 10.10.24 (K) ; Broadway 6214, Morne Bleu, 16.5.26 (K) ; Williams, Herb. Trin. 12027, Morne l'Enver reserve, 27.8.28 (T) ; Simmonds, Herb. Trin. 13904, Piedra blanca Naranja, 23.2.47 (T, K) ; Simmonds, Herb. Trin. 13905, Morne Bleu, 20.4.47 (T) ; Simmonds, Herb. Trin. 13906, Maracas Valley near the Falls, 16.5.47 (T) ; Simmonds, Herb. Trin. 13907, Naranja-Piedra blanca, 10.8.47 (T).

Trinidad and Tobago.

General in the wetter forests and especially common at about 2000' in the Northern Range.

Northern tropical South America.

P. broadwayi seems to be a small (? lowland) form of *P. karstenianum* and one grades into the other.

31. ***Syngonium vellozianum*** Schott var. ***oblongisectum*** Engl. ex Engler and Krause in Engl. Pflzr. 4, 23 E (1920), 127.

Fendler 738 (K) ; Alexander, Herb. Trin. 5597, Carenage, April 1893 (T) ; Broadway, Herb. Trin. 7620, Moruga, La Fortune trace, 14.2.16 (T) ; Britton and Broadway 2795, forest, Siparia Quarry, 8.4.21 (K).

Trinidad.

General, but rare.

Northern tropical South America.

32. ***Typhonium trilobatum*** (L.) Schott in Wien. Zeitschr. 3 (1829), 72.

Engler in Engl. Pflzr. 4, 23 F (1920), 117.

Hort. Trin., 1906 (T) ; Broadway, St. Clair Experiment Station, 25.7.19 (T) ; Broadway 6992, Botanic Gardens, "wild", 9.7.28 (K) ; Simmonds, Herb. Trin. 13877, St. Augustine, 16.7.47 (T).

Trinidad.

An alien, naturalized locally.

Tropical Asia.

The Trinidad plant is var. *genuinum* Engl.

33. ***Pistia stratiotes*** L. Sp. Pl., 1 (1753), 963.

Crueger, Herb. Trin. 2242, Botanic Gardens, Jan. 1850 (T) ; Broadway, Herb. Trin. 8954, Irois, 23.11.16 (T).

Trinidad.

Floating in ponds, etc.

Pantropical.

Perhaps a naturalized alien in Trinidad.

Doubtful and rejected species.

Calla palustris L. is represented by *Herb. Trin.* 2241 (det. T. S. Hazen). The sheet bears neither date nor locality; and the original label is in an unknown handwriting. The sheet is attributed to Crueger in the Herbarium register, which seems unlikely.

Philodendron micans (Klotzsch) Schott is recorded from Tobago by Engler and Krause (*Pflzr.* 4, 23 DB (1913) 59). The species is probably a juvenile form which has sometimes been cultivated as a foliage-plant; flowers have never been described.

Cultivated Plants.—L. H. Bailey's *Manual of Cultivated Plants*, published in 1923, has long been esteemed as a handy reference-book, especially by those not fortunate enough to have access to the standard encyclopedias such as Baileys own *Standard Cyclopedia of Horticulture* or Nicholson's *Illustrated Dictionary of Gardening*. A revised and much enlarged edition of the *Manual** is therefore sure of a warm welcome.

The full title of the book, "*Manual of Cultivated Plants Most Commonly Grown in the Continental United States and Canada*", defines its scope, but it should be noted that horticultural varieties are not included and the book is confined to species and a few hybrids. Altogether 5347 species are keyed and described—albeit briefly—but still more are mentioned incidentally. Having regard to the set limits of the work a surprisingly wide variety of plants is included, no fewer than 1523 genera and 194 families being represented. It is interesting to note that quite a number of common British wild plants are included, for example the primrose, cowslip, and oxlip, *Campanula glomerata*, *C. rotundifolia*, and *Viola riviniana*, and that mention is made of one of our rarietis, *Erica mackaiana*.

A valuable feature of the work is that keys are provided to families, genera, and species, and these seem clear, straightforward, and easy to use—practical in fact. Particular attention has been paid to the nomenclature of the plants, in order to bring it into line with modern interpretations under the International Rules. This has had at least one unfortunate result—namely the transference of the name *Amaryllis* from the Cape Belladonna (the plant generally known as *Amaryllis Belladonna*) to the plants generally known as *Hippeastrum*, and the inclusion of the Cape Belladonna in *Brunsvigia*, as *B. rosea*. This conforms to the practice of American horticultural writers, but is not accepted by professional botanists in this country. Not only is there ample evidence to show that the Cape Belladonna is the plant to which the name *Amaryllis* properly belongs, but also the plant is quite clearly generically distinct from *Brunsvigia*.

Preceding each family is an illustration, comprising a number of line-drawings to show features of the family. These should prove useful to those who may be unfamiliar with the group concerned.

J. ROBERT SEALY.

*L. H. Bailey, *Manual of Cultivated Plants*, Revised Edition, pp. 1116 fig. 195. Macmillan Co. New York. 1949. £4 7s. 6d.

MANNA AND ITS SOURCES.

S. G. HARRISON.

INTRODUCTION.

Mannas have been known from the earliest times, particularly in Asia Minor, where some mannas are still regularly used in the preparation of local sweetmeats, which are highly esteemed. Others are better known for their medicinal, mainly laxative, properties.

The word manna has been used very generally to describe saccharine exudations from a number of different plants, belonging to various families. Some of these exudations consist largely of the hexahydric alcohol mannite or mannitol, associated with the sugars manninotriose and manneotetrose; in others the principle sugars are sucrose and dextrose, and mannite is absent.

In some instances the term manna is applied to the entire organism, as, for example, certain edible lichens and fungi. In other types of manna, the word is applied to substances which are actually of animal origin and are only produced indirectly from plants, although often confused with direct exudations from the plants themselves.

The different kinds of manna may be briefly summarized as follows:—

I. **Plant.**

A. Cryptogams.

Various lichens and fungi have been mentioned in the literature on this subject, the term manna being usually applied to the entire organism and not to any exudation.

B. Phanerogams.

(i). Direct Exudation occurring naturally without any apparent stimulus, e.g. *Myoporum platycarpum* R. Br., in which the cause of the secretion remains obscure. In other instances the exudation may be attributable to minute insect punctures which are not easily observed.

(ii). Direct Exudation, artificially produced by man-made wounds. This is the method used in the commercial production of manna from the manna ash (*Fraxinus ornus* L.), the trees being tapped through incisions made in the bark.

II. **Animal.**

(i). Indirect Plant Exudation, being excretion by Aphids or Coccids which feed by sucking up plant juices. This type of manna, an example of which is that produced from certain species of *Tamarix*, is analogous to the honey dew formation which is a familiar phenomenon in this country.

(ii). Animal. A type of manna more obviously of animal origin is Trehala manna, which consists of cocoons of *Larinus nidificans* (Coleoptera), found on *Echinops* spp.

It may be seen from this short introduction that mannas are extremely diverse in their origin—as they are also in their composition.

The use of the word “manna” for any particular substance appears to be purely arbitrary, although it seems to be based essentially on the idea that manna is a “gift from God”. The term has therefore been applied to diverse substances which apparently “came from Heaven”, in the

sense that they were found on the ground or on trees, shrubs or herbs, as though they had simply fallen out of the sky. This conception of a Heavenly gift has centred around Biblical countries, most mannas having been found in Asia Minor.

BIBLICAL MANNA.

The earliest references to manna occur in the Old Testament and have therefore long been known to both Jew and Gentile; whilst for the followers of the Prophet, the Koran also contains a brief narrative.

“ And when the dew that lay was gone up, behold, upon the face of the wilderness there lay a small round thing, as small as the hoar frost on the ground And when they did mete it with an o’mer, he that gathered much had nothing over, and he that gathered little had no lack And Moses said, Let no man leave it till the morning but some of them left it until the morning, and it bred worms and stank And they gathered it every morning and when the sun waned hot, it melted And the house of Israel called the name thereof Manna : and it was like coriander seed, white ; and the taste of it was like wafers made with honey ” (Exodus XVI. 14–36).

“ And the manna was a coriander seed, and the colour thereof as the colour of bdellium ” (Numbers XI. 7–9).

“ And we caused clouds to overshadow them, and sent down upon them the manna and the quails——” The Koran, Sura vii—Al Araf.

These descriptions are vague and may be too inaccurate to afford any real clue to the identity of the substance in question.

An organism which at one time was generally accepted as being the Biblical manna is the Lichen, *Lecanora esculenta* Evers, found on rocks and stones in the lands between Asia Minor and the northern Sahara, along with *L. esculenta* var. *jussufii*. At certain times these lichens may be broken up by drought and winds into small particles, which lodge in cracks in the ground, or accumulate in the lee of bushes as detritus, following violent winds or rain.

It has been pointed out that the lichens do not “ appear with the dew, breed worms, nor melt in the sun ”, all of which are characters descriptive of many of the fungi, *sensu stricta*, rather than of the lichens.

Hence a theory has been held that the manna of the Children of Israel was actually a fungus (12). A substance which apparently answers to the original description was noted on the plateau between Lakes Tanganyika and Nyasa, where it was gathered by the Amamburi tribe who called it “ the Food of God ”. It was white, very similar to porridge, and had to be gathered before sunrise as it melted in the sun and became full of worms if kept overnight. It was sweet to the taste and resembled coriander seed. It is unfortunate that this traveller’s tale is not known to have been substantiated by the production of a specimen of the substance, but it has led one author to assume that it might be a “ mushroom spawn ”, without suggesting any possible genus. Arguments were put forward to show that it was not at all improbable that this Central African “ manna ” might also occur in Arabia.

In 1927 an expedition from Jerusalem University set out to demonstrate the identity of manna by a sojourn in the desert on the Sinai Peninsula. After some weeks of observation and experiment they concluded that Biblical manna was a phenomenon familiar in other countries as honey dew, a sweet excretion produced by Aphids and Coccids, liquid at first but later solidifying. The two coccids mainly responsible for manna in the Sinai Peninsula are stated to be *Trabutina mannipara* Ehrenb. and *Najacoccus serpentinus* var. *minor* Green, both on *Tamarix nilotica* var. *mannifera* Ehr. No manna was observed on other species of *Tamarix*. The expedition showed that fluid is ingested from the phloem vessels by the insects and excreted as a clear liquid, crystallizing in the dry desert climate and covering the branches or falling to the ground as the white grains of Biblical manna. Other species of *Tamarix* are recorded as producers of manna, but production is often confined to certain areas, which would explain the failure of the Jerusalem University Expedition to find manna on more than the one species in the Sinai Peninsula.

One argument against *Tamarisk* manna being that of the Scripture is that substances which are used today as either drugs or sweetmeats would hardly suffice as the staple food of a people for any length of time. This argument would apply similarly to any of the other modern mannas. Possibly the miracle of the Old Testament was the presence of a sweetmeat in sufficient quantities to form a welcome and nourishing addition to the diet of people having to exist on very frugal supplies of food. We all realize how necessary appetisers are in times of rationing, to make a monotonous diet more palatable.

The nomadic people of many parts of Asia Minor live very similarly today, subsisting mainly on their flocks and herds and regarding "natural" additions to their diet, such as fungi, lichens and mannas, as "Gifts from God". It is possible that the manna of the Bible was actually more than one substance, the description being of a conspicuous type and symbolic of the whole. Fossil stumps have been found which indicate that at the time of the Exodus the Sinai Peninsula was a wilderness of Tamarisk trees and bushes and not a bare desert.

A LIST OF SPECIES RECORDED AS PRODUCERS OF MANNA.

Cryptogams.

Fungi.

Certain fungi have been associated with manna on the grounds that they contain the sugar, trehalose, which is the chief sugar of trehala manna (see *Echinops* p. 408). Trehalose has been found, for example, in *Boletus edulis* Bull. ex Fr. (*Polyporaceae*) and in *Lactarius piperatus* (Scop. ex Fr.) Fr. (*Agaricaceae*).

In addition to the larger fungi, instances are recorded of the occurrence of this sugar in the *Mucorales* and Yeasts, (also in *Myxomycetes*).

Lichens.

Certain species growing in Asia Minor, notably *Lecanora esculenta* Evers and *Lecanora affinis* Evers, have been supposed to be the manna of the Scriptures. In some parts of the world today lichens are still collected for human consumption and are regarded as manna, in the biblical sense. A specimen of *L. esculenta* in the Museum collection at Kew is

stated to be found on the sides of the mountains in Persia (Iran), and largely eaten by the poor in times of famine. This specimen consists of irregular, wrinkled, slightly flattened pellets, averaging about 10 mm. in two planes and about 6 mm. in the third. Although the outer surfaces of the pellets are now pinkish-grey it is probable that this is due to ageing, the inside being still pinkish white. A specimen of *L. affinis* in the same collection is generally about half the size of the previous species, darker on the outside with a whitish core, and with small white-tipped protuberances in addition to folds and wrinkles. This particular specimen came from Anatolia, where the natives called it "manna" and used it to make a kind of bread. Apparently it can only be obtained after a heavy fall of dew, which governs the local belief that it actually fell with the dew.

Moghadan (18) mentions *Chlorangium jussufii* Rabh., which is a synonym of *Lecanora esculenta* var. *jussufii* Stur. (*Parmelia esculenta* Sprol., *Lecanora desertorum* Krumphr. and *Lichen esculentus* Pallas are other synonyms of *Lecanora esculenta* Evers, which are to be found in literature on the subject). Moghadan states that *Chlorangium jussufii* is collected in the deserts of Persia and made into a type of bread, which is sold in the bazaars of Teheran and elsewhere as "Schirsad" and is supposed to encourage lactation.

Gymnosperms.

Coniferae.

Larix. So far as is known the only family in this group which produces manna is the *Pinaceae*, the most important species being larch, *Larix decidua* Mill., the source of Briancon manna, which contains the sugar melezitose. The earliest mention of Briancon manna appears to be in 1542, when it was listed in the Paris Customs Tariff as Manna Brianzona or Manna Brigantiaca. Briancon (France) remained the only source of supply until 1919, when larch manna was discovered in Switzerland. It is evidently secreted by aphids, as are the honeydews of lime and poplar trees, which also contain melezitose, and is in fact the undigested residue of carbohydrates from the sap sucked out of the foliage by the insect, in this instance probably by the aphid *Lachnus laricis* Walk.

In one of the Kew Museums there is a specimen dated 1864, obtained by Daniel Hanbury near Chantemerle in the Hautes Alpes, Dauphiny. It consists of amorphous crumbs, brown in colour, no doubt with age. A more recent specimen, still fairly white in colour, is that obtained by Prof. A. Henry in Switzerland in 1923 (10). Here the crumbs are preserved *in situ* where they have been deposited on the foliage of the larch. Larch manna is rare and costly. It was at one time used as a mild purgative. It has also been used as a culture medium in bacteriology.

Manna has also been found on Western larch, *Larix occidentalis* Nutt., for example, in the year 1898 in British Columbia. These two species of larch appear to be the only members of the genus from which manna has been recorded.

Pinus. The Bhutan pine, *Pinus wallichiana* A. B. Jacks, syn. *P. excelsa* Wall. and the Chir pine, *P. roxburghii* Sarg., syn. *P. longifolia* Roxb., in the Himalayas, produce manna which is collected and eaten or used to

adulterate honey. It has been stated that the production of manna is usually quite small and large exudations only occur once in 20 or 30 years. Watt (19) notes that exudations from *P. wallichiana* occur from the tips of the twigs and cement the needles into clotted masses, which, melting in the sun, encrust leaves, twigs and stones around the trees with a varnish like covering. It seems probable that it is of aphid origin.

Pinus lambertiana Dougl. is mentioned by Moghadan. This is the Sugar Pine of N. America, the popular name being a reference to a sugary secretion from the trunk, which is not known to have been termed manna. The pine mannas have not been extensively examined and no chemical analysis of them is known to be available.

Pseudotsuga. Douglas Fir manna was first discovered in 1914 in British Columbia, where it is confined to dry alpine valleys and is only produced in hot summers. It resembles larch manna in appearance and also contains a high percentage of melezitose. Prof. A. Henry notes that this is of interest, in view of the close affinity between *Larix* and *Pseudotsuga*. A specimen of sugar deposits on twigs of *Pseudotsuga taxifolia* (Poir.) Rehd. (*P. douglasii* Carr.), which was obtained in British Columbia, was received at Kew in 1929. This particular specimen has not, however, been analysed.

Cedrus. The Cedar of Lebanon is mentioned by both Moghadan (18) and Watt (19), but the latter probably confused it with *C. deodara* Loud. Manna from Cedar of Lebanon has been described as bitter and unpleasant, which may indicate that the substance referred to was partly of a resinous or terebinthine nature. The National Standard Dispensatory of 1905 referred to Lebanon manna as "small sweet grains obtained from *Cedrus libanotica* Link.", but no recent accounts or records of Cedar manna have been found.

Angiosperms.

1. *Tamaricaceae*.

Tamarix. Tamarisk manna has long been known in Iran and Armenia, where it is collected for use in native sweetmeats and as a drug. Hooper enumerated the manna yielding species of *Tamarix* in 1909 and recorded details of native names and the uses to which the mannas had been put (14). From the records available it is not always easy to ascertain the exact species to which particular statements apply. It seems clear however that mannas are produced by at least four species and probably one or two others about which the records are less precise. Tamarisk manna is produced in Arabia, Iran, Baluchistan, Afghanistan and parts of Central Asia. It is exported to certain Moslem countries, e.g. to India, formerly, probably now to Pakistan, for use as a drug, considered to be a mild laxative.

In Iran, sweets called "gazangabin" are prepared from manna or "gez", mixed with rosewater, flour and pistachio nuts. The word gazangabin has also been applied to products prepared from *Cotoneaster*, *Alhagi* and *Salsola* mannas. Production of Tamarisk mannas appears to be somewhat local. For instance, that of *T. aphylla* (L.) Karst. (*T. articulata* Vahl.) is only recorded from Baluchistan, Afghanistan, Arabia, and Iran, although the species is said to be widely distributed in the Punjab, Egypt, Somaliland and Western Asia. A specimen of Gazangabin from this species is in one of the Kew museums. Originally it was

in the India Museum. Unfortunately the place of origin of this specimen cannot be ascertained.

References to *Tamarix gallica* L. are somewhat confused. It has been stated that a variety, *T. gallica* var. *mannifera* Ehr. is a source of manna only in south eastern Iran. It is the chief producer of the "Gaz" used in the manufacture of Gazangabin and is exported from Iran in considerable quantities. It is believed that this manna is the result of punctures formed by *Coccus manniparus* which attacks this species in Iran, Arabia, Afghanistan and Egypt. Manna from this species of *Tamarix* has not been reported in many parts of its range, which includes India and China. It is not certain whether this is due to the absence of the Coccid from these areas or whether it may indicate that the species is represented there by a different variety which for some reason does not enable Coccids to produce manna.

T. pentandra Pall. (*T. pallasii* Desv.) is widely distributed in Baluchistan where it yields a sweet gum which is sometimes classed as a manna (15). A specimen of this, which is in a collection of Persian Drugs at Kew, is a sweet amorphous mass, resembling glue or brown treacle in colour and of the consistency of a stiff dough.

T. macrocarpa Ehr. ex Bunge is said to occasionally bear a "saline incrustation", which may actually be a manna.

An account of the manna of *Tamarix nilotica* Ehr. has already been given. It seems probable from the descriptions available that most, if not all, Tamarisk mannas are insect secretions of the honey-dew type. Hooper states that India Museum specimens were examined and found to contain a large percentage of reducing sugars but no mannite.

2. *Celastraceae*.

Gymnosporia. In 1913 a specimen of this genus, probably *G. deflexa* Sprague, was received at the Imperial Institute from north western Rhodesia, bearing a white incrustation of "manna". This was further examined and found to consist of 54% dulcitol, 6.4% dextrose sugar and 6.6% sucrose. Apparently the quantity of the residue was too small for further examination. (1). No repetition of the appearance of this manna has been noted.

3. *Leguminosae*.

Alhagi camelorum Fisch. (*A. persarum* Boiss. & Buhse), and *A. maurorum* Desv. (*Hedysarum alhagi* L.), are both known to yield manna but only the latter is represented in the Kew collection. There are two specimens; one is a dry brown dust, stated to be "A better and new variety received from Agra in 1876", the other consists of sticky, glistening brown tears, ranging in colour from light brown to almost black. The latter was collected in Afghanistan and presented by Dr. Aitchison in 1886. The uses of *Alhagi* manna are similar to those of Tamarisk, chiefly in the manufacture of sweets and as a mild laxative. According to Moghadan it is called Tarandjabine in Iran, where it is largely used in popular medicines. It is collected by shaking twigs over a cloth. *Alhagi* mannas have been discussed also by Chevalier (2).

Astragalus. It has been stated that two species of this genus were a source of supply of manna collected in the mountain districts of Chahar-Mahal and Faraidan (9), but no other records have been found.

Indigofera semitrijuga Forsk has been mentioned as a manna producing plant (2).

4. *Rosaceae*.

Cotoneaster nummularia F. & M. is the source of Shirkhist, a manna which is often confused with the Gaz of *Tamarix* and is used, like the latter, in the preparation of the sweet, gazangabin, in Iran. Shirkhist manna collected by Dr. Aitchison in Afghanistan is in the form of rough whitish brown cakes, about 2 in. - 3 in. across, whilst another specimen of Shirkhist more nearly resembles Gazangabin in form, colour and consistency. There appears to have been some confusion between the raw material and the sweetmeats which are prepared from the manna.

5. *Combretaceae*.

Madagascar manna has been stated to be the secretion of a cricket, *Phremnia rubra* Signoret, which lives on bushes of the family *Combretaceae* (6).

6. *Myrtaceae*.

The mannas of this family, although not of great economic importance, have been the subject of a number of studies by Maiden and others in Australia.

The following have been recorded as producers of manna.

Leptospermum scoparium Forst. "Tea tree". A small quantity of "manna" was reported on a twig in 1895, but was not analysed.

Eucalyptus. Manna, in varying quantities, has been reported from a considerable number of species, not all confirmed. *E. cinerea* F. v. M., *E. cinerea* var *nova-anglica* Maiden, *E. corymbosa* Sm., *E. eximia* Schau., *E. foecunda* Schau., *E. gomphocephala* D.C., *E. gunnii* Hook., *E. mannifera* Mudie, *E. multiflora* Rich., *E. oleosa* F. Muell., *E. punctata* D.C., *E. resinifera* Sm., *E. rubida* Deane et Maiden, *E. stuartiana* F. Muell., *E. terminalis* F. Muell., *E. viminalis* Labill. (syn. *mannifera* A. Gunn.).

From the specimens available in the Kew collections it is evident that *Eucalyptus* mannas are of at least two distinct types. Specimens from *E. gunnii* and *E. multiflora* consist of whitish brown tears, resembling larch manna in appearance. It seems that this type is produced in times of drought through rupture of the cortical vessels of the tree. This is known to occur in *E. viminalis* and *E. rubida*. This type of manna dissolves readily in water and is stated by Maiden to be frequently taken as a pleasant purgative in some parts of Australia,—dose for a healthy adult 2½–3 tablespoons full. The action is claimed to be so mild that it may be administered to the smallest infant. The first manna to be noticed in Australia was that of *E. viminalis*, which has also been found in the Argentine (4). In the former country it was long confused with *E. rubida*. An entirely different type of manna is that produced on *E. oleosa*, which consists of flat woolly brown discs, about the size of a halfpenny, each composed of a number of flat cells in a honeycomb pattern, suggesting that each cell has been the home of one of the insects responsible for secreting the manna. This manna is termed "Lerp" and resembles that found on *E. rubida*, which is produced by a species of *Spondyliaspis* (*Psylla*), according to the paragraph on the zoology of mannas by Maiden (17).

Ordinary *Eucalyptus* mannas, in addition to those caused by drought, have been attributed to various insects, including *Cicadidae*, *Cercopidae* (Froghoppers), and *Coleoptera*.

7. *Compositae*.

Trehala manna, in which the chief sugar is trehalose, is the cocoon of the beetle, *Larinus nidificans*, produced on *Echinops persicus* Stev, and probably other species. There are specimens from three different areas in the Kew Museum collections. One is of Trehala or "Tihan" from Baghdad; the plant source of which is not noted. Another is "Shek Roukeh", which is recorded as being produced by the larvae of a Rhynchophorus insect on the "Tucee plant", *Echinops* sp., at Kirrind, Iran. The appearance of this sample is very similar to the specimen from Baghdad. The third specimen is "Shukkur Tigel" from the East Indies, which is recorded as being "cocoon on *Echinops* sp., having a sweet taste". The biology, chemistry and history of Trehala manna and trehalose are treated in some detail by Moghadan (18).

8. *Ericaceae*.

Rhododendron arboreum Sm. has been stated to be the source of a manna, but this has not been confirmed (19).

9. *Oleaceae*.

Fraxinus manna is probably the best known of all commercial mannas. It is produced chiefly from the Manna Ash, *Fraxinus ornus* L., a native of southern Europe, which is cultivated for the production of manna, especially in Sicily. Commencing when the tree is about ten years old, the stem is tapped by making daily incisions in the bark, from which the liquid manna exudes, congealing on the trunk. In wet weather it remains liquid rather longer and often falls to the ground, being then considered to be of inferior quality, although it may be caught on the flat branches of *Opuntia* placed beneath the tree to prevent the manna from becoming soiled. Alternate sides of the tree are incised for three years, after which the exhausted stem is cut down and two or more new shoots are allowed to grow up from the stump, to be ready for tapping again in ten years time.

There are a number of samples of Sicilian manna in the Kew museum, in the form of lumps or rods of varying sizes and varying in colour from almost white to a medium brown. The better quality mannas are flaky in consistency, the inferior grades are more agglutinated and darker in colour. A specimen of manna from *F. ornus* var. *rotundifolia*, from Madras, is similar to the Sicilian manna in appearance. The "Shirkhist" from *F. floribunda* Wall., from Lahore, and a manna from a species of *Fraxinus* in Herat are both brown and crumbly compared with the European Ash mannas of comparable age.

Fraxinus ornus manna has long been known and used as a gentle laxative. It consists of from 40% to 60% mannite, 6% to 16% manninotriose and 12% to 16% manneotetrose (7).

The olive, *Olea europea* L., is capable of exuding a manna, according to Moghadan.

10. *Asclepiadaceae*.

Calotropis gigantea R. Br. is contained in Watt's list of manna producing plants in India. It is said to be the source of the manna called "Shukuri Tighal".

Calotropis procera R. Br., as *Apocynum syriacum* S. G. Gmel., was noticed by Moghadan in a list of Persian herbs compiled by Schlimmer in 1874, but not verified as a manna producing species.

11. *Scrophulariaceae*.

Melampyrum nemorosum L. is referred to by Watt as being the source of "Madagascar manna", but this has not been confirmed.

12. *Myoporaceae*.

Myoporum platycarpum R. Br. was first recorded as a source of manna in Australia in 1882 and was long known to be a food of the aborigines in the interior. In 1892 the exudate was regarded by Maiden to be a perfect substitute for European Ash manna, but it has remained neglected until quite recently, when investigations were commenced by the Council of Scientific and Industrial Research (Australia) with the intention of determining the potential value of the exudate as a source of mannitol for industry. It has been shown that 60% to 70% of the total solids in this manna consist of mannite, but unfortunately *M. platycarpum* cannot be made to exude manna by mechanical injury, as in the commercial production of Ash manna. In fact, the reason for the natural exudation remains a mystery, as it has been observed that manna production by this species is not always associated with the presence of insect bores. It has been suggested that the presence of a yeast and two species of bacteria may provide the key to the problem, but as yet no positive experimental results have been obtained (5).

13. *Chenopodiaceae*.

Salsola foetida Del.

Manna from this species is noted by Watt and was described by Aitchison in Iran (14).

14. *Polygonaceae*.

Atraphaxis spinosa L. is the source of a manna called "Schirkhecht" in Iran (18). It is stated to be found in mountainous regions near Teheran in the form of white viscous grains about the size of peas and is used as a laxative and purgative in local medicine.

15. *Fagaceae*.

Quercus. Oak manna is known to occur on *Quercus incana* Roxb. and *Q. persica* Jaub et Spach, and may also occur on other species. It is collected in Iran and Irak, where it is used to make confectionery; in particular, a type of nougat is prepared by clarification of the manna and the addition of sugar, white of egg and nuts. This is sold in the form of small, flattened, round cakes of a light buff colour. The manna itself is marketed as dark greenish brown lumps flecked with buff coloured particles. The specimens in the museum at Kew include some which were collected in 1947. All are hard and brittle and similar in colour.

Manna from *Q. vallonica* is noted by Deerr (3) but in the absence of an authority it is uncertain whether the species referred to is actually *Q. aegilops* L. or *Q. cerris* L.

16. *Salicaceae*.

Salix. Moghadan notes the occurrence of mannas on *Salix fragilis* L., *S. persica* Boiss., and *S. tetrasperma* Roxb. The only specimen of *Salix* manna at Kew was collected from an unidentified willow at Quetta, Baluchistan, where the product is known as "Bed-khist", probably derived from the Irani name "Bid-khecht". In the environs of Teheran, manna is stated to form on the willow trunks in the form of viscous white globules, during the months of August and September. Production is variable and unreliable, and is believed to be independent of any insect interference. It is probably of the type initiated by the effect of the heat in summer. The manna is used chiefly in local medicine.

16. *Scitamineae*.

Ensete superbum (Roxb.) Cheesman (*Musa superba* Roxb.) is mentioned as a source of manna by Watt, but no details are available.

18. *Palmae*.

Again, Watt must be quoted. He simply tabulates "*Palmae*, various species", in his list of manna plants, and no further details have been found.

19. *Gramineae*.

"Bamboo". A bamboo manna was reported on the stems of *Dendrocalamus strictus* Nees in March 1899. It was in the form of short rods, white or light brown in colour, and was pleasantly sweet, the chief sugar being a saccharose, probably cane sugar. Its appearance was opportune, coming as it did at a time when India was in the throes of a serious famine, and the natives of those parts of the Central Provinces which were favoured by its presence were not slow to appreciate its palatability. It did not contain mannitol (13). A sugary exudation previously reported on *Bambusa arundinacea* Willd. and "*Bambusa verticellata*" has never been confirmed and may have been confused with "Tabashir", a siliceous substance which is produced inside the stems of certain bamboos and has long been used in Indian medicine, as an aphrodisiac, stimulant, etc. It has been stated that manna from *B. arundinacea* is attributable to an aphid, *Oregma bambusae*. Further investigation would be desirable.

Dichanthium annulatum (Forsk.) Stapf (*Andropogon annulatus* Forsk.), an Australian Blue Grass, has produced a substance shown to consist principally of Mannite (17).

Phragmites communis Trin. is stated to have been the source of a manna collected by Indians in the State of California. No further details are known (8).

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International Rules of Botanical Nomenclature*.—In *Kew Bull.* 1948 (2), 172 (1948), we noticed the reprint of the International Rules, with the Amsterdam additions, issued by the Chronica Botanica Company in 1948. The same firm has now issued a report of the proceedings of the Symposium held at Utrecht in 1948, with the Amsterdam additions as a supplement. Two other supplements concern a proposed International Society of Plant Taxonomists, and the personnel of the International Commission for [Botanical] Nomenclature. The work is embellished with facsimiles of title-pages of earlier nomenclatural works, such as De Candolle's *Lois* (1867), and, though something of a "mixed bag", will undoubtedly fulfil a useful purpose in connection with the Stockholm Congress.

**Botanical Nomenclature and Taxonomy. A Symposium organized by the International Union of Biological Sciences with support of UNESCO at Utrecht, the Netherlands, June 14-19, 1948.* Edited by J. Lanjouw, Ph.D. With a Supplement to the International Rules of Botanical Nomenclature, embodying the alterations made at the Sixth International Congress, Amsterdam, 1935, compiled by T. A. Sprague, D.Sc., Rapporteur Général. (I.U.B.S., Series B, Colloquia, No. 2). *Chronica Botanica*, 12 (1/2), pp. viii + 88. 1950. Price \$2.50. (Waltham, Mass.: The Chronica Botanica Co.; London, W.C.2.: Wm. Dawson and Sons Limited.).

A NEW SPECIES OF BRIEYA FROM ANGOLA.

By A. W. EXELL.

Brieya latipetala Exell, sp. nov. *Arbor* 4 m. alta, ramulis brunneo-tomentellis. *Folia* breviter petiolata, petiolo incrassato, 2-4 mm. longo, tomentello, lamina oblonga vel oblongo-elliptica apice acuminata basi cordata, 11-22 $\times$ 5-10.5 cm., supra costa media excepta tomentella glabra subtus sparse pilosula demum fere glabra, costa media supra depressa tomentella subtus prominente pubescente, nervis lateralibus 11-16 paribus subtus prominulis. *Flores* solitarii (vel fasciculati?) breviter pedunculati, pedunculo bracteolato, 4-10 mm. longo, brunneo-tomentello, in axillis foliorum dispositi. *Sepala* 3 transverse elliptica apice mucronulata, 3 $\times$ 4 mm., extus pubescentia intus glabra. *Petala* 3 exteriora late ovato-triangularia apice mucronulata, 3 $\times$ 2.5 mm., extus pubescentia intus glabra, 3 interiora lanceolata vel oblique lanceolata, 40-45 $\times$ 10-20 mm., juventute pubescentia demum glabrescentia. *Stamina* numerosissima, antheris 1.7 mm. longis, thecis apicem versus leviter divergentibus glabris, connectivo applanato glabro. *Carpella* 4 (an semper?) oblonga, 2.5 $\times$.8 mm., sericea, ovulis circa 20 biserialiter dispositis. *Monocarpia* 4 (an semper?) libera sessilia late cylindrica, 3-5 $\times$ 1.8-2.8 cm., glabra, seminibus 4-10 anguste reniformibus, 1-1.6 cm. longis.

ANGOLA: Lunda District, Dundo, near the River Luachimo, 700 m., 6 Jun. 1948, J. Gossweiler 14048 (Type in Kew Herbarium). "Shrub-like tree of 4 m. height, irregularly branched; three inner petals of corolla green, turning white. Sporadic in humid gallery woods."

The genus *Brieya* De Wild. [Annonaceae] was described from the Belgian Congo (Ganda-Sundi) with one species, *Brieya fasciculata* De Wild. This was later collected by Mr. Gossweiler in the Mayumbe forest region of Cabinda and by Mr. C. Vigne in the Gold Coast (Fomang Su Reserve).

The new species here described has leaves closely resembling those of *B. fasciculata* but it can be at once distinguished from the latter by the lanceolate inner petals, nearly 2 cm. broad, the inner petals of De Wildeman's species being strap-shaped and less than 10 mm. broad (rarely exceeding 7 mm. in the material seen). The broad inner petals give the plant more the appearance of a *Piptostigma*, a genus closely related to *Brieya*, but the monocarps are quite free, the principal character distinguishing *Brieya* from *Piptostigma* in which the monocarps are coalescent at the base.

Brieya was described as having 6-4 ovules in each carpel. There were at least 20 in each of the carpels of *B. latipetala* dissected but this difference is probably not of great significance. The number of ovules is very variable in *Piptostigma*.

The collection from which the species was described was made by Mr. Gossweiler in the extreme north of the Lunda District of Angola near the frontier with the Belgian Congo. Riverine forest seems to be well developed in this region and to show considerable affinity with the west African rain-forest of Cabinda and Gaboon. Among several interesting new records for Angola contained in this collection, the remarkable *Phylloclinum paradoxum* Baill., with epiphyllous inflorescences, is noteworthy.

A NOTE ON PARADISEA, DIURANTHERA AND NOTHOLIRION.

WILLIAM T. STEARN.

The genus *Paradisea* was based by Giovanni Mazzucato in 1811 on a European species, *P. liliastrum* (L.) Bertol., syn. *Hemerocallis liliastrum* L., *Liliastrum album* Link. St. Bruno's Lily, as this plant is sometimes called in allusion to its occurrence on the mountains of Dauphiné where Bruno (1030–1101) founded the Carthusian Order, is a well known member of the *Liliaceae* subfamily *Asphodeloideae* tribe *Asphodeleae*. Its stout roots spring from a compact rootstock, not from a bulb ; the leaves are numerous and basal, the flower-stem bracteate, unbranched, leafless, with a one-sided raceme of a few short-pedicelled rather funnel-shaped white flowers having the anthers deeply indented at base, the ovary ovoid, the stigma slightly swollen but not trifid ; the capsule has wingless angled seeds. It grows at 5,500 to 7,800 feet in the Pyrenees, the Jura, the Alps and the Apennines ; a sketch-map by Suessenguth of its distribution is reproduced in H. Meusel, *Vergleichende Arealkunde*, **2**, K. 55 (1943). In Portugal there is a related plant which has been called *Paradisea liliastrum* var. *lusitanicum* P. Coutinho, *P. lusitanicum* (P. Cout.) Sampaio, *Anthericum lusitanicum* (P. Gout.) Sampaio, *Liliastrum lusitanicum* (P. Cout.) Rothmaler.‡

The real founder of this genus was Tournefort who defined it with precision in his *Elémens de Botanique*, 296, t. 194 (1694) and *Institutiones*, 369, t. 194 (1700) under the name *Liliastrum* signifying “une plante qui approche du Lis”, not “lily-star” or “star-lily” as sometimes stated ; the suffix *-astrum* is a variant of the usually derogatory suffix *-aster* (incompletely resembling) found in such words as *philosophaster* (a bad philosopher), *pinaster* (a wild pine), *oleaster* (a wild olive) etc. Linnæus adopted Tournefort's generic name as a specific epithet under *Hemerocallis* in 1753 and *Anthericum* in 1762, but Ortega in his *Tabulae Botanicae*, 26 (1772), 2nd ed. 78 (1783), an exposition of Tournefort's system as opposed to the Linnæan system of classification, re-instated *Liliastrum* in generic rank, as Link did later. *Liliastrum* thus has priority over *Paradisea* and was adopted by Rothmaler in Fedde, *Repert.* **49**, 55 (1940) in place of this. The name *Paradisea*, in the amended form *Paradisia* proposed by Bertoloni, *Fl. Ital.* **4**, 134 (1839–41), has, however, become so widely known and is adopted in so many floras, encyclopaedias and standard taxonomic reference works such as Bentham and Hooker's *Genera Plantarum* and Engler and Prantl's *Pflanzenfamilien*, that its conservation is obviously desirable, and has been formally proposed by Janchen.

It should be noted that this name commemorates an Italian botanist, Giovanni Paradisi (1760–1820), a senator of Modena, and has no direct connexion with “Greek *paradise*, a garden or garden of the future world” as erroneously stated in a well-known and generally reliable manual of cultivated plants. The original description, reprinted below, occurs in a work of extreme rarity, *Viaggio botanico all' Alpi Giulie* ; Lettera del Professor Mazzucato (Udine, 1811) :—

‡According to Rothmaler the distinctions between the two species are as follows :—*P. liliastrum*, leaves to 8.5 mm. broad, inflorescence one-sided, flowers about 5 cm. long, pedicel not articulated ; *P. lusitanicum*, leaves 7 to 18 mm. broad, plant more robust, 60 to 150 cm. high, inflorescence not one-sided, flowers 2.5 to 3 cm. long, pedicel articulated (cf Fedde, *Repert.* **49**, 174 : 1940).

" *Hexandria*.

PARADISEA MAZZ.

Monogynia.*Genus novum*

Cal : o. Cor: 6. petala, campanulato-cylindrica. Stam: declinata.
Caps: ovata.

PARADISEA HEMEROANTHERICOIDES

P. radice fasciculata carnosae, foliis planis sub-gramineis, scapo simplicissimo, corollis campanulato-cylindricis secundis. Mazz.

Hemerocallis Liliastrum scapo simplici, corollis hexapetalis campanulatis.

Linn. sp : plant : I. p. 324. Hort : cliff : 128. Miller dict : n. 4.

Hemerocallis floribus spicatis secundis. Haller. *helv.* N.1230.

Anthericum Liliastrum foliis planis, scapo simplicissimo, corollis campanulatis, staminibus declinatis. *Lepech : it. I. p. 197. Kniph. cent. 7. n.30. Willd. spec : pl. T.2, p.I. p. 142.*

Liliastrum alpinum majus, & minus. Tournef : *inst : 369. t. 194.*

Phalangium magno flore. Bauh : *pin. 29.*

Phalangium allobrogicum majus. Clus : *cur. app : alt.*

Phalangium. Dalecamp : *hist : p. 852.*

Paradisea—Giglio selvatico—Giglio di Monte

Abitat in alpibus, praesertim in pascuis montis Sutrii, loco vulgo dicto Stuart.

Perennis. Floret junio.

Characteres generici *Hemerocallis*, atque *Antherici* huic plantae communes, novum genus postulant. Habeant in hoc Botanici virtutum eximiarum viri excellentissimi Comitibus Senatoribus PARADISI monumentum."

Most authors have considered *Paradisea* a monotypic genus but in 1922 Alexander Lingelsheim (1874–1937) greatly enlarged its definition to accommodate three Asiatic species. Two of these were the plants of western China which constitute the genus *Diuranthera*, i.e. *D. major* Hemsley and *D. minor* (C. H. Wright) Hemsley. The third was a new species, *Paradisea bulbulifera* Lingelsh., based on a specimen collected in eastern Tibet by Dr. Wolfgang Limpricht* ; in *Die natürlichen Pflanzenfamilien*, 2nd ed. 15d., 279 (1930) Dr. K. Krause accepted this species as the sole member of *Paradisea* sect. *Archi-Paradisea* Lingelsh.

Lingelsheim divided the enlarged genus *Paradisea* into three sections, i.e. sect. *Eu-Paradisea* (*Paradisea* sensu stricto) typified by the European *P.*

*In 1914 Limpricht made a plant-collecting journey across western China to Tatsienlu (Kangting) and Batang (Paan) in eastern Tibet. Later he visited other regions of China and by the time of his return to Germany in 1920 had amassed a herbarium of over three thousand gatherings. These he took to Breslau (now Wrocław). Here and at Berlin and Coburg they were identified "rasch und energisch" by a team of German botanists, some of whom had then little experience with Chinese plants. An enumeration edited by Ferdinand Pax appeared in 1922 as part of Limpricht's "Botanische Reisen in den Hochgebirgen Chinas und Ost-Tibets" (Fedde, Repert. Beih. 12). Subsequent investigation of his specimens, the first set of which was deposited at Breslau, has led to considerable reduction in the number of supposed new species as well as the correction of many misidentifications. In 1940 Limpricht accordingly published a supplementary paper entitled "Umbestimmungen und Namensänderungen in Aufzählung der von Dr. W. Limpricht in Ostasien gesammelten Pflanzen" (Fedde, Repert. 50, 214–231) listing all the rectifications known to him. This list contains no reference, however, to *Paradisea bulbulifera* Lingelsh.

liliastrum, sect. *Diuranthera* containing the two Chinese species, *P. minor* C. H. Wright (syn. *Diuranthera minor* (C. H. Wright) Hemsley) and *P. major* (Hemsley) Lingelsh. (syn. *D. major* Hemsley), and sect. *Archi-Paradisea* based on *P. bulbulifera*. *Diuranthera* is unlike *Paradisea* in habit, has smaller flowers, with the anthers prolonged at base into two short appendages (whence the name), and rounded somewhat disc-like seeds ; it merits the generic rank given it by Hemsley in Hooker, *Icones Pl.* (4) **8**, t. 2734 (1902). Lingelsheim's third section *Archi-Paradisea* must also be excluded from *Paradisea*. It is in fact synonymous with the genus *Notholirion* and so belongs to the *Liliaceae* subfamily *Liliodeae* tribe *Lilieae**. Lingelsheim's detailed and accurate description of his *P. bulbulifera* notes the presence of minute brownish bulbils at the base of the stem, a feature certainly not to be expected in *Paradisea* and other members of the *Asphodeleae* but which characterizes *Notholirion*. The bulb in this genus is tunicated, and consists of a few membranous scales formed from dried leaf-bases surrounding a few rather fleshy scales which never possess a lamina ; stalked bulblets are formed on the inside of these scales. The bulb takes several years to reach flowering size and, after flowering, perishes, leaving a host of bulblets around the base of the stem. Misled by the general resemblance in habit of his Tibetan plant to the European *Paradisea*, Lingelsheim interpreted the stem-base as being rhizomatous and did not realize that the "Blattanlage" there were the exhausted remnants of a bulb. Moreover he had no mature capsule available. He observed, however, that the flowering stem was leafy, the anthers entire and versatile, the ovary cylindric with very numerous ovules, the stigma trifid. These features likewise characterize the genus *Notholirion*, of which one species, *N. hyacinthinum* (Wils.) Stapf, has often been collected in western China and adjacent Tibet. Lingelsheim's *Paradisea bulbulifera* undoubtedly belongs to this species. The type-specimen may no longer be in existence but it was carefully examined by Dr. Harry Smith of Uppsala in 1936 and identified by him then as *N. hyacinthinum* ; he reports that it was "a good complete specimen representing the normal plant". E. H. Wilson described and illustrated this in 1925, under the name *Lilium hyacinthinum*, from the upland meadows round Tatsienlu, between 1000 and 1200 feet, scarcely a hundred miles south-east of the locality, "Dawo (Ressenyi), zwischen Muru und Girseh gomba, 3800 m.", where Limpricht collected *Paradisea bulbulifera*. Unfortunately Lingelsheim's epithet has priority over Wilson's and thus has to be transferred to *Notholirion* :—

***Notholirion bulbuliferum* (Lingelsh.) Stearn**

Paradisea bulbulifera Lingelsheim in Fedde, *Repert. Beih.* **12**, 316 (1922) ; K. Krause in Engler, *Nat. Pflanzenfam.* **15a**, 279 (1930).

Lilium hyacinthinum Wilson, *Lilies E. Asia*, 100, t. 15 (1925).

Notholirion hyacinthinum (Wilson) Stapf in *Kew Bull.* **1934**, 96 ; Cotton in *Royal Hort. Soc., Lily Year Book*, **3**, 18, fig. 5 (1934) ; Grove & Cotton, *Suppl. Elwes' Mon. Lilium*, 131, t. 29 (1940) ; Woodcock & Stearn, *Lilies of World*, 377, fig. 124, 134 (1950).

Liliastrum bulbuliferum (Lingelsh.) Rothmaler in Fedde, *Repert.* **49**, 55 (1940).

*cf. F. Buxbaum in *Bot. Archiv*, **38**, 389 (1937).

The species is distributed from western China, over south-eastern Tibet, northern Assam, Bhutan and Sikkim to Nepal.

The writer is indebted to Dr. Harry Smith (Uppsala) for information about the type-specimen of *Paradisea bulbulifera*, to Prof. Charles Baehni (Geneva) for a transcript of the original description of the genus *Paradisea*, and to Mr. J. R. Sealy (Kew) for constructive criticism of the above note.

Summary. Lingelsheim's broad concept of the genus *Paradisea* is considered untenable. *Paradisea* sensu stricto, syn. *Paradisea* sect. *Eu-Paradisea*, is an exclusively European genus, from which Lingelsheim's Chinese section *Diuranthera* differs sufficiently to merit restoration to generic rank, while his Tibetan section *Archi-Paradisea* is synonymous with the genus *Notholirion*, having been based on a specimen of *N. hyacinthinum* (Wilson) Stapf. For this species the name *N. bulbuliferum* is adopted. The conservation of the name *Paradisea*, in the amended form *Paradisia*, is supported against *Liliastrum*.

Papers of the Michigan Academy of Science, Arts and Letters*—

The thirty-third and thirty-fourth volumes for the years 1947 (1949) and 1948 (1950) of this publication, contain the papers submitted at the Annual Meetings of the Academy in 1947 and 1948. These are arranged under the headings Botany, Forestry, Zoology, Geography, Geology, Anthropology, Economics, History and Political Science, Folklore, Landscape Architecture, Language, Literature, Medical Science, Sociology and Philosophy. Included in the Botany and Forestry sections are papers on the "Dormancy and Germination of Seeds of the Bur Reeds, *Sparganium* spp.", "Studies in the genus *Poria*", and "Some Resupinate Polypores from the Region of the Great Lakes". The volumes which are well printed and produced are illustrated by a number of photographs, maps and diagrams, and each is provided with an author index.

H. S. MARSHALL.

*Papers of the Michigan Academy of Science Arts and Letters. Edited by Eugene S. McCartney and Frederick K. Sparrow. Volume 33 (1949). Pp. x + 414 + ii. 1949. Price 60/-. Volume 34 (1948). Pp. xiii + 352 + iii. 1950. Price 55/-. Ann Arbor : University of Michigan Press. London : Geoffrey Cumberlege.

Anatomy of the Dicotyledons*:—In the editorial preface of the English translation of Solereder's "Systematic Anatomy of the Dicotyledons" the late Dr. D. H. Scott wrote : "Covering as it does, with marvellous completeness and exactitude, the most extensive and important division of the Vegetable Kingdom, the 'Systematic Anatomy' forms an indispensable work of reference... and serves... as by far the best source from which students may gain an idea of the objects and methods of this young and vigorous branch of Botany".

Those who were active in Botany at the time these words were written can best judge the progress of the "young and vigorous branch of Botany". Botanists of a younger generation will probably regard its advance as disappointing and feel that its vigour soon declined although, to be true, there has been one notable revival—the enormous interest in wood structure which started some thirty years ago and which has been maintained ever since. There is now, however, a quickening of interest in anatomy and perhaps a more realistic attitude towards its worth for taxonomic purposes, and the appearance of the new "Anatomy of the Dicotyledons", almost 42 years to a day after Scott's preface was written, is a notable botanical event, for it cannot but serve to stimulate such work, while its encyclopaedic treatment of the subject will prove invaluable both to the student and investigator.

The "Anatomy of the Dicotyledons" is not a new edition of Solereder, although it is based upon much the same plan. The biggest difference between the two books is the space which the newer one devotes to the mature secondary wood, deriving from the modern appreciation of the fact that anatomical data on timber must be obtained from mature wood and not based, like those of Solereder, on a study of small twigs. The "Anatomy of the Dicotyledons" forms the first comprehensive systematic survey of wood structure : it does great service in sorting and bringing together the vast amount of work, and too frequently undisciplined work, on this subject.

In general the anatomical data for each family follow a unified plan. There is first a general summary of anatomical characters, followed by a more detailed description of the leaf and the axis, information on the axis being divided, where applicable, into axes of a few season's growth, and the mature wood, i.e. timber. The term axis is used, apparently, in reference to subaerial axes, for roots and rhizomes are grouped together as a separate section, a procedure which, while indefensible on morphological grounds, is no doubt dictated by convenience. This section on root and rhizome is often very sketchy by reason of the scanty information available. There follow sections on Taxonomic Anatomy and on Economic Uses, while the concluding section, which is followed by a summary of the literature of the family, is headed "Genera described" and where occasion warrants consists of two lists, the first of genera from which the general anatomical data have been derived, and the other of genera on which the details of wood structure have been based.

The book concludes with valuable lists of families in which certain diagnostic anatomical features occur and in a bibliography of over 2,500

*Anatomy of the Dicotyledons : by C. R. Metcalfe & L. Chalk, with the assistance of M. M. Chattaway, C. L. Hare, F. R. Richardson & E. M. Slatter. 2 vols. pp. lxiv + 1500, with 317 figures in the text. 1950. Clarendon Press, Oxford. £6 6s. net.

references to literature published since the appearance of the English translation of Solereder.

The arrangement of the families follows the system of Bentham and Hooker. Since no system of classification attains perfection the choice of arrangement was necessarily somewhat arbitrary. That adopted at least has the advantage of being the one which Solereder used, while it seems specially appropriate for a work originating at Kew.

Although Scott referred to the "marvellous completeness" with which Solereder covered the Dicotyledons it may be doubted whether the authors of the new book would choose to have their work thus described, although it exceeds its predecessor by some 300 pages, and keeps within these bounds only by a more condensed treatment, and by the omission of some of the minutiae of detail in Solereder. The task which they set themselves was immense, even with the fruits of Solereder's pioneer labours at hand, and there is no doubt that much remains to be accomplished before the plant anatomist, like the systematist, can refer to a book as complete as "Die Natürlichen Pflanzenfamilien", for it is with such a book that the "Anatomy of the Dicotyledons" is most aptly compared. Perhaps the comment which best sums up the authors' task, and the manner in which it has been accomplished, is that in the foreword which refers to "a simplification of treatment that a mastery of detail can alone achieve".

It is no new thesis that classification should be based on as wide a range of characters as possible, and while it seems probable that floral characters will always form the main basis of classification in the Dicotyledons, there can be little doubt that such a classification will be on a firmer basis when full use is made of all the characters of the plants. Anatomical characters cannot, of themselves, form a basis for classification but rather an extension of, and a supplement to, the external morphological characters. Anatomy is sometimes helpful in specific determinations, but in general, for special and more trivial groups the data of the cytologist and geneticist are of greater value, while anatomy is likely to be more useful in determining the affinities of larger groups like families.

To what extent the taxonomist and systematist will make use of the wealth of data in this new book remains to be seen. As the authors point out, the anatomist has at times failed to realise the limitations of his subject and has drawn conclusions of a taxonomic nature which the taxonomist views with suspicion, while, at the same time, the taxonomist has not always appreciated the value of anatomical research. Nor, for that matter, do many anatomists cover their subject, but in general, fall into one of two groups—those who are wood anatomists and those who are not. This regrettable state of affairs must remain, it is to be feared, until plant anatomy and taxonomy are taught in a realistic way. The "Anatomy of the Dicotyledons" is a well-balanced book, and no criticism of this nature can be levelled against it; the authors are not, they admit, taxonomists, but they have had ample opportunity for consulting with leading taxonomists and have taken full advantage of their good fortune. If the book succeeds in accomplishing a synthesis of anatomy and taxonomy it will serve Botany well and if it fails in this it will still remain the standard cyclopaedia of systematic and taxonomic anatomy for many years.

F.W.J.

THE CULTURE OF IRIS EMBRYOS ON NUTRIENT AGAR.

E. M. SLATTER.

Cultivators and breeders of the bearded iris are only too familiar with the difficulties caused by the slow germination of the seeds of many hybrids. The causes of this dormancy in the iris seeds have been investigated by several botanists. Crocker ⁽²⁾ believed it to be due to mechanical forces round the embryo. Much more recently Cox ⁽¹⁾ has demonstrated the presence of chemical substances in the endosperm which inhibit germination and the development of the young seedling. These substances, being very stable and relatively insoluble in water, cannot be removed by soaking the seeds before they are sown. Any method that shows promise of hastening germination would, therefore, be welcomed by all those who specialize in the cultivation and hybridization of the bearded iris. Various methods of storing and treating the seed in the hope of hastening and improving germination have been tried, but without marked success. We are, however, much indebted to Randolph and Cox ⁽³⁾ who have published details of experiments performed with the bearded iris over a period of years. They found that storage just above or just below freezing point, leaching in running water, chipping the seed to expose the radicle, and increasing the oxygen supply to the chipped seeds, increased germination from 15 to 64 per cent, whereas subjecting the seed to continuous low temperatures, or to alternating low and moderate temperatures, and planting in media with pH values of from 4.1 to 8.5 has no beneficial effect. Werkmeister ⁽⁴⁾, however, claimed that iris embryos can be cultured on a nutrient agar medium, and Randolph and Cox were also successful when using a similar method. In their experiments they found that intact seeds would scarcely germinate on agar jelly, and, if half of each seed was cut away before sowing, the embryos and seedlings were deformed because the part of the embryo in contact with the seed was unable to develop as quickly as that in contact with the jelly. However, they showed that, if the embryo is entirely removed from the seed and placed on the agar, it grows rapidly and forms a normal seedling. Since embryos treated in this manner start growing within a few days, plants can be raised and made to flower within a year. This discovery opens up great possibilities to iris breeders and horticulturalists generally. As this technique is not known to have been tested to any great extent in this country, and as it does not appear to be familiar except to iris specialists, it was decided to experiment with Randolph and Cox's method at the Jodrell Laboratory, Royal Botanic Gardens, Kew.

Technique.

For the experiments at Kew the culture medium was prepared as follows. Two stock solutions were made up and labelled A and B respectively. Their composition was as follows :—

Solution A.

Calcium nitrate $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$	...	...	23.6 gms.
Potassium nitrate KNO_3	...	...	8.5 gms.
Potassium chloride KCl	...	...	6.5 gms.
Distilled water	...	...	500 ml.

Solution B.

Ferrous sulphate $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$	...	...	2 gms.
Sodium hexametaphosphate $(\text{NaPO}_3)_n$	...	...	1.0 gm.
Magnesium sulphate $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	...	...	3.6 gms.
Distilled water	...	...	500 ml.

The salts in solution A dissolve immediately, but solution B was made up in two parts to prevent the formation of a precipitate. The iron and magnesium salts were dissolved in 250 ml. of water. Calgon, a proprietary substance which can be used in place of sodium hexametaphosphate, prevents the precipitation of iron and calcium salts and, at the same time, supplies a certain amount of phosphorus. It was dissolved in another 250 ml., and these two solutions were then mixed. Seven gms. of agar, 20 gms. of glucose and 5 ml. of each of the solutions A and B were dissolved in a flask containing a litre of distilled water, and treated in an autoclave at 15 lbs. for 20 minutes. (Some types of domestic pressure cooker would serve as a relatively inexpensive and reliable substitute for the autoclave if one were not available). Thirty ml. of the liquid were poured into each of a number of 4 oz. glass bottles with screw-on caps made of a plastic material and which had previously been treated in an autoclave at 15 lbs. for 20 minutes. The bottles and their contents were then treated in the autoclave again, the caps being loosely screwed down, both on this and the previous occasion. After allowing the bottles to cool, the caps were screwed down firmly.

The seeds to be used were surface sterilized by soaking from 1–2 hours in an aqueous solution of sodium or calcium hypochlorite solution. This was prepared by mixing equal quantities of a domestic bleaching solution such as "Parozone" with water to which a small quantity of the spreading agent "agral x" had been added. The seeds were then washed thoroughly in sterile distilled water and left to soak for about a week, the water being changed daily.

A secluded room was made as free as possible from contaminating fungi and bacteria by wiping all bench surfaces and sprinkling the floor with methylated spirit. Draughts were excluded as far as possible. During the subsequent dissection of the seeds, which is described in the next paragraph, all instruments were dipped in methylated spirit, and passed through the flame of a bunsen burner, and the fingers were frequently dipped in methylated spirit.

The soaked seeds were placed in 50 per cent alcohol for a few minutes. A cut was made opposite the micropylar end, dividing the seed into halves, thus exposing the embryo, which was then removed on the tip of a small scalpel and placed on the surface of the agar. Care was taken to keep the embryo out of contact with the alcohol and to put it, as quickly as possible, into the bottle whilst the latter was held horizontally. The cap was removed for as short a time as possible to minimize the risk of contamination. It was found that the embryos can be more readily removed if the scalpel is first moistened with sterile distilled water. The bottles, with their caps loosely screwed down to allow for slow gaseous exchange with the surrounding atmosphere, were placed in the dark for about a week at a temperature varying between 56°F. and 68°F. until the embryos had germinated. They were then brought into the light.



UPPER. A selection of bearded iris seedlings in agar cultures, 2 months old, heights ranging from 1.2—4.5 cms.

MIDDLE Two plants of bearded iris grown from embryos in agar flowering 18 months afterwards, height approximately 3ft. 8ins.

LOWER The same plants as above 2 months later, heights ranging from 12.7—17.5 cms.

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Unfortunately the weather then became very cold and the temperature dropped about 8°. However, after a few weeks the conditions improved and although the night temperatures averaged only 56°F. the day temperatures rose to as much as 90°F.

The technique described above was not found to be entirely satisfactory because fungal and bacterial infections were not always eliminated, so attempts to improve the method were accordingly made. Some of these tests, owing to the limited numbers of hybrid bearded iris seeds available, were made on seeds of the native species *Iris pseudacorus* which can be readily obtained in large quantities from wild sources. The species proved to be unsuitable, however, since the seeds and embryos are rather small compared with those of the bearded iris, and the endosperm remained hard and brittle even after soaking. It was not, therefore, easy to make the dissections quickly and the embryos were sometimes damaged and had to be discarded. The following modifications were tried.

(i). Seeds were surface sterilized with a 0.1 per cent solution of mercuric chloride instead of in "Parozone".

(ii). The scalpel used to remove the embryos was sterilized by dipping in a 50 per cent. solution of hexylresorcinol as recommended by Randolph and Cox. Undiluted hexylresorcinol was also used.

(iii). Concentrations of 6-9 gms. of both shredded and powdered agar to a litre of water were used in the hope that fungal and bacterial growth would be less rapid on a firmer culture medium.

(iv). The embryos were sown on the agar culture medium in small tubes plugged with cotton wool, instead of in bottles, 15 ml. of the medium being placed in each tube. The tubes require considerably less space than the bottles, a point that would be of considerable importance if the method proved to be suitable for raising iris seedlings on a large scale.

(v). Embryos were sown in pots of sphagnum soaked in culture solution and kept moist with distilled water. The composition of the solution was the same as that used with the agar.

(vi). A comparison was made between seedlings grown in warm-humid and warm-dry conditions after transplanting from the cultures into the soil.

(vii). Embryo cultures were compared with the usual practice of sowing seeds in pans of suitable compost in a greenhouse.

Results.

The dissections in the preliminary experiment were made on February 1st 1947. Germination was rapid. After 4 days, radicles had begun to develop, and after a week were 2-3 cms. long. In 12 days young leaves appeared, and, at the end of the first month, they were about 1 cm. long, the plants by now having developed an extensive root system in the agar. After 2 months the seedlings, which ranged from 3-4 mm. to 3-5 cm. in height, were transplanted into pots of suitable compost. This was done with great care as the roots of the young seedlings were often long and assumed a coiled growth in the agar. The seedlings were gently removed from the bottles, and the roots, after being well washed in water to remove all traces of agar, were spread out on the potting compost. This consisted of peat, sand and loam in equal parts.

Leaf mould was excluded and celluloid labels used instead of wooden ones, both of these precautions being taken to reduce fungal growth.

The seedlings were grown in the pits used for raising tropical plants, as it was thought that the humidity and high temperature (85–95° F.) would favour their early growth. After 3 months, when they were about a foot high, the plants were hardened off in a temperate house (minimum temperature 55°F.) and planted out of doors in July, only 6 months after germination. In the spring of the following year 44 per cent of these plants flowered, and one plant flowered again in July.

The seeds used in this experiment were from the following crosses.

- A. *Iris Zampa* × *Mrs. George Warre*.
- B. (*El Tovar* × *Eternal City*) × *Maiden Blush*.
- C. *Purissima* × *Gudrun*.
- D. *Killiney* × *Phebus*.
- E. *Plicata alba* × *Ariadne*.
- F. *Coronatum* × *President Mitchell*.
- G. *Purissima's Son* × *Oriana*.
- H. *Tenaya* × *Zingarella*.
- I. *Old Gold* × *Prairie Sunset*.
- J. *Purissima* × *Bruno*.
- K. *Radiant* × (*El Tovar* × *Eternal City*).

The embryos from the crosses A. E. F. H. and J all failed to germinate and many of these cultures were badly contaminated. From the other 6 crosses, however, there was 86 per cent germination, and of these, only 8 per cent died before being potted up.

In April 1947 embryos from those crosses which had previously failed were again cultured. The bottles were placed in an incubator at 65°F. (the temperature recommended by the American authors). This time 46 per cent of the embryos germinated, having probably been stimulated by the higher temperature. However, the cultures were again badly infected and none of the embryos survived.

In May and July of 1947 further batches of the successful crosses were cultured. Since the weather was very warm at the time the cultures were kept at room temperature instead of being placed in an incubator. Ninety-eight per cent germinated, but 13 per cent died before being transferred to pots. The seedlings were placed in a frame at a temperature of 80–100°F., but with a dry atmosphere. As the plants did not grow rapidly under these conditions they were transferred to the tropical pits where they developed well. They remained there over the winter and were then removed to a temperate house as before and planted out in July. One plant was then in flower, a year after the commencement of the experiment. In the spring of 1948, 71 per cent of these plants flowered.

The results of these experiments indicate that there are important differences between the seeds from the various crosses. The embryos of some hybrids show a considerable range of size, some being extremely small, and many are curved. The dissections are therefore more difficult to make and this increases the chance of contamination from the atmosphere and also damage to the embryo. However, it would seem that many of the embryos are already infected in the seed or incapable of developing. With seed that is free from this resistant form of contamina-

tion, however, and in which the embryos are of normal size and capable of developing, the agar culture method is a successful and speedy way of raising seedlings of the bearded iris.

The experiments already mentioned, in which attempts were made to improve the original technique, gave the following results.

(i). The comparison between mercuric chloride and "Parozone" for surface sterilization showed that both can be used with success. The "Parozone" solution, however, not only acts more slowly but also tends to soften the seed coat which is then difficult to hold during the subsequent dissection. The mercuric chloride solution has no softening effect on the testa and is therefore more convenient to use.

(ii). Neither concentration of hexylresorcinol was effective in reducing contamination with bacteria or fungi, but, if reasonable precautions against fungal and bacterial attack are taken, there is no great loss of plants through this cause. As has already been emphasized, the most significant fact is that the cultures that were badly infected were all from particular crosses, and no effective chemical treatment for dealing with these could be devised.

(iii). The concentration of agar was found to be important. Fungi and bacteria cannot develop so easily on hard, as they can on soft, agar. Also a firm agar has the advantage of being less liable to liquify in warm weather and so provides a more rigid support for the young plant. When the agar is too hard, however, the roots of the seedling are unable to penetrate it effectively. Of concentrations ranging from 0.6 to 0.9 per cent of both shredded and powdered agar, 0.8 per cent shredded agar was found to be the most satisfactory. The degree of firmness, however, appears to vary considerably according to the brand of agar, and the particular alga from which it is manufactured, so that the most favourable concentration depends on the type of agar used.

(iv). Rapid evaporation of moisture from the agar jelly, when it was placed in test tubes plugged with cotton wool, soon caused the culture medium to become too hard for the radicles to penetrate, and, in consequence, the seedlings were killed. In the experiments at Kew, 2 oz. screw cap bottles, each containing 15 ml. of culture medium, proved to be the most convenient containers for general use.

(v). Sand and Sphagnum placed in flower pots, moistened with nutrient solution without agar, and subsequently kept watered with distilled water, were not found to be satisfactory media in which to grow iris embryos.

(vi). After transplanting the seedlings from the culture bottles, those which were placed in the warm and humid atmosphere of the tropical pits developed much more quickly than those in the warm frame with a drier atmosphere. It is not advisable to make the change too quickly from the high atmospheric humidity in the bottles containing the agar to the less humid air conditions that prevail above the soil in a flower pot.

(vii). Comparison between whole seeds sown in pans of compost and agar cultures of seeds from the same cross that were started at the same time gave the following results. Seedlings averaging 2 cm. in height were obtained from 90 per cent of the embryos within a month, when the agar method was used. Seeds planted in soil, on the other hand, did not appear above the surface until 4 months had elapsed. Seed germination

in soil continued sporadically, however, and, at the end of a year, 68 per cent of the seeds had germinated. It can be seen from the photographs that the plants raised from embryos do not differ in form or vigour from those grown from seed in the normal manner.

Conclusions.

The method of raising iris seedlings by cultivating the excised embryos has the definite advantage that it not only shortens the normal interval between seed-sowing and flowering, but, provided the embryos are viable and not contaminated in the seed, it also ensures that a higher percentage of plants will be obtained. The experiments show clearly that, in a given time, many more plants can be raised by the embryo culture method than by sowing seeds in the normal way, whilst the technique also enables the viability of any particular batch of iris seeds to be determined within a few days. Another advantage is that, under controlled conditions, seedlings can be raised at any time of the year.

The technique requires no special apparatus apart from an autoclave or suitable domestic pressure cooker, and is not difficult. If great care is taken at the two critical stages, that of the dissection itself, and later the transfer from culture bottle to soil, good results can be obtained, again provided the embryos are viable. It cannot be too strongly emphasized, however, that the experiments show quite clearly that the embryos of certain crosses cannot be made to germinate by this method, either because they are so heavily contaminated with bacteria or fungi, or because of their unstable hereditary constitution. Both of these aspects of the subject need further critical investigation. Further experiments with other culture media are also very desirable. For example it has been suggested that cherry agar might give better results because bacteria will not grow readily on this medium, but there has not yet been an opportunity to put this suggestion to the test. It is, therefore, to be hoped that this method will be further improved, and its use extended so that the work of cultivating and hybridizing the bearded iris will be less handicapped by the slow germination of the seeds.

I gratefully acknowledge the interest and help of Dr. C. R. Metcalfe during these investigations and in the preparation of this paper. I am indebted to Mr. C. P. Raffill for bringing this culture technique to my notice, for the seeds he kindly provided and for his valuable assistance in the raising of the young plants, and to other members of the Gardens Staff for their co-operation. I also wish to thank Mr. G. Atkinson for the photographs and Mr. Marsden-Jones for his kindness in collecting seeds of *Iris pseudacorus*. The suggested use of cherry agar made by Miss de Boer of Boskopp is much appreciated.

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TWO NEW SPECIES OF COLCHICUM.

B. L. BURTT.

The two species of *Colchicum* described below are not new discoveries ; they have been passing for some years under the names *C. latifolium* Sibth. & Sm. and *C. sibthorpii* Baker. Mr. E. A. Bowles will discuss them more fully in the second edition of his Handbook of Crocus and Colchicum, which he is now preparing, but the recognition of these new species must be preceded by a brief account of the two names just mentioned. The descriptions are based largely on plants grown in Mr. Bowles's garden at Myddelton House, Enfield, and I am greatly indebted to him for a generous supply of material.

In their *Florae Graecae Prodrum* (1 : 250. 1806) Sibthorp and Smith determined a colchicum collected "in Helicone, Parnasso aliisque Graeciae montibus" as *C. variegatum* L. Later, however, (*Flora Graeca* 4 : 43, t. 350. 1823) they abandoned this identification and published the new species *C. latifolium* Sibth. & Smith. The specimen in question, now in the Sibthorp collection at Oxford and kindly sent on loan to Kew by Professor T. G. B. Osborn, consists of flowers only ; the epithet *latifolium* is derived from the fact that Smith associated with these flowers the description given many years earlier by Clusius (*Hist. Pl.* 1 : 199. 1601) of a plant he called *Colchicum byzantinum latifolium polyanthes*. Smith had failed to note that Clusius's plant had already been made the type of *C. byzantinum* Ker-Gawl. (in *Bot. Mag.* sub t. 1028. 1807) ; consequently the name *C. latifolium* Sibth. & Sm. was illegitimate as originally published.

C. latifolium was not only a *nomen illegitimum*, it was also a *nomen confusum*, for the association of the leaves of *C. byzantinum* with the flowers collected by Sibthorp was false, as will be seen at a glance by comparing the illustration of *C. byzantinum* in the Botanical Magazine with the plate of *C. latifolium*. Baker recognized this and proceeded to rename the plant Sibthorp had collected *C. sibthorpii* Baker (in *Journ. Linn. Soc. Bot.* 17 : 427 : 1879). It will be as well to quote his text in full :—

"9. *C. SIBTHORPII*, Baker.—*C. latifolium*, Sibth. & Smith, *Fl. Graec.* t. 350, quoad flores non folia. Cormus globosus $1\frac{1}{2}$ –2 poll. crassus, tunicis firmis castaneis longe supra collum productis. Folia 4–5 hysteroanthia vernalia. Flores autumnales ad spatham plures. Perianthii tubus saepe semipedalis ; limbus lilacino-purpureus obscure tessellatus 21–24 lin. longus, segmentis oblongo-ob lanceolatis obtusis 8–9 lin. latis venis 20 vel ultra percursis. Stamina perianthio triente breviora, antheris 4 lin. longis. Styli antheras superantes, apice stigmatoso leviter curvati. *Graeciae in montibus Atticae*, Von Heldreich ! *C. variegatum*, Sieber, *Herb. Crete Exsicc.* ! non Linn., est forma imperfecte cognita, verisimiliter affinis."

In deciding what is to be regarded as the lectotype of *C. sibthorpii* it is necessary to recognize clearly the various elements combined in Baker's publication of the name. They are :—

1. The synonym *C. latifolium* Sibth. & Sm. *Fl. Graec.* t. 350 quoad flores non folia.

2. The specimens collected by Heldreich from which Baker described the flowers.
3. The specimen collected by Heldreich from which Baker described the leaves.
4. The uncertain synonym *C. variegatum* Sieber.

Clearly the last of these can be dismissed from consideration. So also can the specimen from which Baker described the leaves, for it is clear that he paid little attention to them, giving neither size nor shape; further, the single specimen of leaves written up by Baker as *C. sibthorpii* came from Parnassus, not from Attica, and was almost certainly wrongly associated with Heldreich's flowering specimens. I consider that the leaves described by Baker belong to *C. parnassicum* Sart. et Boiss.

The lectotype of *C. sibthorpii* Baker must therefore be either Sibthorp's plant or one of Heldreich's flowering specimens. There are two objections to taking Sibthorp's plant as the lectotype, and these are sufficient to override the consideration that Baker called the species *C. sibthorpii*: first, Baker knew only the illustration in *Flora Graeca*, there is no evidence that he ever saw the specimen at Oxford; secondly, we only have the indefinite locality, Helicon, Parnassus and other mountains in Greece. Baker clearly took his detailed knowledge of this species, as shown by his description of corm and flowers, from the herbarium specimens collected by Heldreich which he had before him at Kew. I therefore choose one of these named by Baker himself as the lectotype of the species:—

GREECE. Attica, in regione abiegna montis Parnethos, Sept. 1847, *Heldreich* (Herb. Hook. in Herb. Kew.).

With the identity of *C. sibthorpii* thus defined we can safely apply this name to a plant collected by Mr. E. A. Bowles at Tatoi, near the foot of Mt. Parnes, and grown by him at Myddelton House, Enfield. Now, therefore, for the first time we are able to describe leaves which belong without doubt to flowering specimens agreeing with the chosen type. The leaves of the Tatoi plant are 7–8 in number, about 20 cm. long and 1.6–1.8 cm. broad, strongly undulate on the margin when young and lying flat on the ground.

Twelve years after publishing *C. sibthorpii*, Baker illustrated a plant under the same name in Curtis's Botanical Magazine (t. 7181). This had larger, more globular flowers than the true *C. sibthorpii*, broader perianth segments, and leaves suberect and not undulated on their margins. The plants had come from Max Leichtlin and their precise origin was not given; it is now clear, however, that this species, which can scarcely be considered the same as *C. sibthorpii*, is a native of the mountains of northern Greece and does not extend as far south as Attica. Mr. Bowles has it in cultivation from corms sent to him from Salonika. In confirmation of this we find under *C. callicymbium* Stearn & Stefanoff (Journ. of Bot. 1934, 343) the following quotation from a letter by R. Irwin Lynch "Leichtlin says that this *Colchicum* [i.e. *C. callicymbium*] must have come from the habitat of *C. Sibthorpii* [i.e. the northern plant], viz., 'the monastery of Hagios Dionysis next to Kraterino, Gulf of Salonica' ". It is described below as *C. bowlesianum* B. L. Burtt.

It is unfortunately not possible to discriminate sharply enough between *C. sibthorpii* and *C. bowlesianum* to enable all the herbarium material to be satisfactorily determined. The flowers lose so much of their character in being dried and not one of the specimens concerned has leaves collected from the same locality associated with it. It will be necessary to make a fresh start in order to trace the distribution of these two species. Flowering specimens should be lifted and grown on in the garden so that leaves can be obtained.

There is another colchicum, found in Crete, to which the name *C. latifolium* is still being applied. This Cretan plant is far more distinct from *C. sibthorpii* than is *C. bowlesianum*. Its flowers are shaped like a straight-sided funnel, without the curved outline found in *C. sibthorpii* and, to a greater degree, in *C. bowlesianum*; the perianth tube is triangular. The leaves are very large and strongly plicate, a character in which it resembles *C. cilicicum* Dammer and *C. byzantinum* Ker-Gawl. This Cretan species is the plant which Sieber referred to *C. variegatum* L. and which Baker cited as a doubtful synonym of *C. sibthorpii*. It is not endemic to Crete, for it has also been found on the island of Rhodes on the other side of the Aegean Sea. That the plants from Crete and Rhodes belong to the same species has been clear from a comparison of the living plants in Mr. Bowles's garden where the plant from Crete (collected by Mr. H. C. Baker) and that from Rhodes (collected by Mr. Ogilvie Grant) grow within a few yards of one another. The latter is, at present, a smaller plant, but there is no significant difference of character. This species is described below as *C. macrophyllum* B. L. Burtt.

Colchicum bowlesianum B. L. Burtt, sp. nov., *C. sibthorpii* Baker affinis sed foliis suberectis haud undulatis, floribus majoribus saturatus coloratis, perianthii segmentis obtusioribus, antheris aequilongis sed angustioribus distinguendum.

Folia hysternanthia, circiter 9, late linearia; lamina 20–25 cm. longa et 3 cm. usque lata, apice obtusa, suberecta, margine haud undulata, saturate viridis. *Flores* autumnales. *Perianthii tubus* pallidus, parte supra terram circiter 15 cm. longa, cylindricus; *segmenta* oblongo-obovata, 4·5–5·5 cm. longa, 1·5–2 cm. lata, apice rotundata, pulchre purpureo-tessellata, basin versus pallidiora, medio ad basin leviter sulcata et circa sulcum papillosa. *Stamina* leviter inaequalia; filamenta alba basi leviter incrassata et aurantiaca, ad apicem attenuata, 2–3 cm. longa; antherae 11 mm. longae et 2·5 mm. latae, sordide purpureae, polline luteo praeditae. *Styli* antheras aequantes, apice valde unilateraliter incrassati et subhamati, unilateraliter stigmatosi. *Fructus* ovoideus, circiter 2 cm. longus.

GREECE. Corms collected in neighbourhood of Salonika, cult. E. A. Bowles (type). Corms collected near the monastery of Hagios Dionoysis, Mt. Olympus, cult. in hort. bot. reg., Kew, 1890 (type of Bot. Mag. t. 7181).

Colchicum macrophyllum B. L. Burtt sp. nov. inter species floribus tessellatis praeditas foliis permagnis plicatis, floribus infundibuliformibus tubo triquetro segmentis ex albo pallidissime lilacinis leviter et irregulariter tessellatis, stigmatibus curvatis sed vix incrassatis, polline viridi

facile distinguitur. Ad *C. cilicicum* Dammer ob folia plicata accedit sed ab hac specie floribus tessellatis paucis stigmatibus valde unilateralibus falcatis longe distat.

Cormus 5-6 cm. diametro, tunica brunnea in collum robustum producta. *Folia* hysternanthia, saepissime 4, magna, valde plicata, circiter 35 cm. longa et 14 cm. lata, laete viridia vel luteo-viridia, ovata vel elliptico-ovata, acuta vel acuminata, margine haud undulata. *Perianthii tubus* valde triquetrus, supra terram circiter 5 cm. productus; limbus infundibuliformis; segmenta oblongo-elliptica, 4.5 cm. longa 2.2 cm. lata, ex albo pallidissime lilacino-tessellata, intus ad basin sulcatus. *Stamina* alternatim leviter inaequalia; filamenta alba 2 cm. longa, basi leviter incrassata et aurantiaca, subulata ad apicem attenuata; antherae dorsifixae, 8-10 mm. longae, purpureae, connectivo pallidiore, polline viridi. *Styli* antheras aequantes, apices versus leviter curvati, vix incrassati, albi purpureo-suffusi, unilateraliter stigmatosi. *Fructus* circiter 5 cm. longus, utrinque acutus.

CRETE. Sine loc., coll. *H. C. Baker*, cult. *E. A. Bowles* (type). *Sphakia*, *Sieber* (sub *C. variegato*). Vamos, prope Retymo, fallow fields of terra-rossa, flowers tessellated, September 1938, *Barneby & Davis*. Ad Prosnero, distr. *Sphakia*, in saxosis, Oct. 1899, *Kalaidis* (*Baldacci*, Iter Creticum Alterum—in herb. mus. brit.!).

RHODES. Sine loc., coll. & cult. *M. Ogilvie Grant* (etiam in hort. *E. A. Bowles* culta). Mount of Prophet Ilias, Oct. 1948, *Goulimy* 12.

An Earlier Name for *Omphalia flavida* Maubl. and Rangel

Examination of the type of *Agaricus citricolor* Berk. & Curt., 1868, viz. Wright 15 from Cuba, shows it to be the fungus well known to plant pathologists as *Omphalia flavida* Maubl. & Rangel 1914. The characteristic gemmifers, *Stilbum flavidum* Cooke, are present on Wright's material. This species is evidently common on native shrubs and herbs in West Indian rain forests well away from plantations as is shown by the following collections:

JAMAICA: on creeping herb in elfin woodland, west slope of High Peak, Blue Mountains, 22.XII.1949, *Dennis* J 43.

TRINIDAD: on unidentified fallen leaves in lower montane forest, 1800 ft., north of Arima, 25.IX.1949, *Dennis* 69.

The fungus is evidently a *Mycena* in the sense of Kühner and of A. H. Smith and should be known as *Mycena citricolor* (Berk. & Curt.) Sacc.

R. W. G. DENNIS.

PITHOCARPA LINDL.

P. LEWIS AND V. S. SUMMERHAYES.

The small Australian Composite genus *Pithocarpa* was first proposed by Lindley in 1839 in his classic paper on "The Vegetation of the Swan River Colony" (now Western Australia) which was published as an appendix to the Botanical Register*. Lindley considered it to be allied to *Humea* in floral structure, but pointed out the marked difference in habit. He recognised two species, *P. pulchella*, which, in view of its being mentioned first, and its much longer description, should be considered as the type species, and *P. corymbulosa*, which is indicated as differing by the corymbose inflorescences, the almost wholly involucre and the scarious outer involucral bracts. In neither case is any locality mentioned, nor is there any information accompanying the type specimens, but in view of the small area of the Colony known at that time, the species were almost certainly not collected far from Perth.

The next treatment of the genus was by Steetz in Lehmann's account of the Western Australian plants collected by Preiss.† Steetz enumerated two species, one which he identified with Lindley's *P. corymbulosa* and, secondly, a new one, *P. major*. *P. pulchella* Lindl., which was not among Preiss's collections, he considered to be near *P. corymbulosa*, but it seems evident from his description that the plant he named *P. pulchella* was different from Lindley's original plant. It is also clear that he had not seen the true *P. corymbulosa*, since none of his descriptions fits that species. In fact none of the plants mentioned by him is correctly named! His *P. major* is evidently identical with *P. pulchella* Lindl., while the plants he referred to *P. corymbulosa* and *P. pulchella* are two distinct species described later in this paper.

In *Flora Australiensis*§ Bentham introduced a new source of confusion by recognising only one species which he called *P. corymbulosa* Lindl. He states that the species "varies much in the size of the flower heads" but that he could "find no other difference" and that "the intermediate sizes are numerous". On the contrary we find that the sizes of the flower heads in several of the species are sharply defined and that intermediate sizes are comparatively uncommon. In his treatment of the genus as monotypic Bentham was followed by Gardner‡ in his enumeration of the flora of Western Australia.

When attempting to name several specimens, referable to this genus, in a collection made by Mr. J. Souster, we were struck by the great differences between many of the other specimens in the Kew herbarium. A careful examination, including dissections of all the gatherings, showed that far from being monotypic, the genus, as known to us at present, consists of four clearly defined species of which two have been previously unnamed. The species also have distinct geographical distributions, so far as our records show, three of the species occurring in the Perth region, broadly speaking, whereas the fourth is restricted to the regions surround-

*Edwards, Bot. Reg., App. Vols. 1-23, p. xxiii (1839).

†Lehmann, *Plantae Preissianae*, 1, 445-6 (1845).

§*Flora Australiensis*, 3, 590 (1866).

‡Enum. Plant. Austral. Occid. 134 (1931).

ing Albany. A good deal more exploration, however, is necessary to enable us to obtain a clear idea of the distributions of the several species.

It therefore seems worth while to present the results of our investigations in a formal manner, including a key for identifying the species, descriptions of the two new species, and an enumeration of the specimens seen by us.

Pithocarpa Lindl.

Annual herbs up to 2 feet in height, often somewhat woody at the base, with erect or ascending much branched stems. *Leaves* alternate, mostly borne on the lower part of the stem, linear to narrowly oblanceolate, the lower ones up to 3 cm. in length, the upper gradually smaller and indistinguishable from the lower inflorescence bracts, the stems and lower surfaces of the leaves more or less woolly. *Capitula* either single on lateral branches or in small corymbs of 2-9 capitula, these corymbs sometimes aggregated to form larger corymbose panicles. *Capitula* homogamous, not truly radiate, 3-15 mm. in diameter. *Involucre* turbinate or obconical, consisting of numerous (30-90) bracts, the outer ones short and adpressed, the inner much longer, with more or less coloured radiating laminae, all (especially the outer ones) with woolly hairs outside. *Receptacle* flat, without scales. *Florets* 15-65, all hermaphrodite, tubular, 5-toothed at the apex. *Anthers* with fine tails at the bases of the thecae. *Style* branches divaricate, $\pm$ recurved, truncate and often shortly penicillate at the apex. *Ovary* glabrous or papillose, pappus absent. *Achenes* angular.

Four species, all natives of Western Australia.

Type species : *P. pulchella* Lindl.

KEY TO SPECIES.

Involucral bracts without dark pigment, up to 45 in number ; ovary glabrous ; receptacle 1.5-2 mm. long ; capitula 3-5 mm. in diameter, in well-marked corymbs containing up to 9 capitula, the lower corymbs borne on long incurved peduncles up to 13 cm. in length ; flowers 15-20 per capitulum ; corolla 2-2.5 mm. long ; lower leaves over 3.5 mm. wide 1 *corymbulosa*

Involucral bracts with dark pigment, usually over 45 in number ; ovary variously papillose ; receptacle over 2 mm. long ; capitula usually more than 5 mm. in diameter ; corymbs not very distinct, only rarely containing 4-5 capitula, capitula sometimes solitary on long peduncles ; flowers over 20 per capitulum ; lower leaves less than 2 mm. wide :

Stigma with darkly pigmented papillae along outer surface and tips ; involucral bracts tipped with very dark brown, 35-70 in number, middle bracts with slightly flexuous margins ; stems much branching just above the base, slender, ascending, rather flexuous

3 *melanostigma*

Stigma without darkly pigmented papillae ; involucral bracts tipped with medium to dark brown, over 60 in number, margins of middle bracts not flexuous ; stems erect, rather stiff :

Capitula 4-8 mm. in diameter, usually in small corymbs of 2-5 capitula, but sometimes solitary ; involucral bracts 60-75, largest 4.5-6 mm. in length ; receptacle 2.25-2.5 mm. long ; flowers 20-25 per capitulum ; corolla 1.5-2 mm. long

2 *achilleoides*

Capitula 10–15 mm. in diameter, mostly solitary on long peduncles, but sometimes forming small corymbs of up to 4 capitula ; involucre bracts 75–100, largest 7·5–10 mm. in length ; receptacle 3–4·5 mm. long ; flowers 40–65 per capitulum ; corolla 2·5–3 mm. long 4 *pulchella*

Enumeration of Species.

1. ***Pithocarpa corymbulosa*** Lindl. in Edwards, Bot. Reg. App. vols. 1–23, p. xxiii (1839) ; ? Gardner, Enum. Pl. Austral. Occid. 134 (1931), partim.

WESTERN AUSTRALIA. "Swan River", *Toward* (type in Herb. Cantab.) ; Greenmount, Darling Range, 19 Feb. 1898, *Morrison* 8232 ; Lesmurdie Falls, on Yule Brook, S.W. of Kalamunda, dry stony hillside, plants drying off when found, apparently annuals, 1–2 ft., 19 Jan. 1947, *Souster* 623 ; no locality or date, *Morrison*.

P. corymbulosa appears on general grounds to be the most primitive member of the genus. The capitula are smaller than in any other species and are aggregated into small groups which together form flat-topped corymbs somewhat reminiscent of an *Achillea*. In addition the involucre bracts show the least amount of differentiation from one another in shape or size. Apart from the inflorescence characters the species may be recognised by the comparatively broad lower leaves which are usually over 3·5 mm. in width.

This is the only species in which we have seen any developed achenes. Those seen appear to be still immature and are obtusely angular and quite glabrous like the ovaries. The ovaries in the other species are papillose but no achenes have been seen.

For some unexplained reason the name has been adopted by various authors to include all the species of the genus known to them and this has given a false impression of its frequency. Actually the species appears to be very local in distribution and this may account for it not having been re-collected for many years after Mr. Toward first gathered it. All the known localities are on the escarpment of the plateau, generally known as the Darling Range.

2. ***P. achilleoides*** *P. Lewis & Summerh.*, sp. nov. ; a *P. corymbulosa* Lindl. foliis inferioribus angustioribus, capitulis minus aggregatis, bracteis involucre plus numerosis exterioribus apice acutioribus coloratis, a *P. pulchella* Lindl. capitulis minoribus magis aggregatis, bracteis involucre minus numerosis minoribus, floribus per capitulum 20–25, corolla brevioris satis differt.

[*P. corymbulosa* (non Lindl.) Steetz in Lehm. Pl. Preiss. 1 ; 445 (1845) ; Benth. Fl. Austral. 3, 590 (1866), partim ; Gardner, Enum. Pl. Austral. Occid. 134 (1931), partim.]

Herba verosimiliter annua, erecta, saepius 30–45 cm. alta, e basi multiramosa. *Caules* basi sublignosi, rigidi, teretes, usque ad 3 mm. diametro sed saepius angustiores, inferne foliati, superne subnudi in inflorescentias transcuntes, lana tenui ± adpressa omnino obtecti. *Folia* sessilia vel subsessilia, linearia ad anguste oblanceolata, inferiora 13–20 mm. longa, 0·75–1·75 mm. lata, superiora sensim decrescentia, in bracteis inflorescentiae abeuntia, marginibus ± recurvatis, supra leviter

asperula et sparse adpresse lanata, subtus dense lanata. *Capitula* ad apices ramorum subreceptorum vel sub-patentium rarius solitaria vel saepius 2-5-aggregata, pedunculata, 4-8 mm. diametro, 20-25-flora; receptaculum 2.25-2.5 mm. longum. *Involucrum* turbinatum; bracteae pluriseriatae, 60-75, infimae minimae, lanceolatae, acuminatae, inferiores sensim longiores, lineari-lanceolatae, mediocres e basi angusta oblanceolatae, omniae superne brunneo-coloratae extra inferne breviter lanatae, superiores e basi angusta spathulato-lanceolatae, acutae, albae, superne radiatae, 4.75-6 mm. longae, superne 1-1.75 mm. latae, supremae (interiores) quam superiores breviores et multo angustiores, $\pm$ anguste spathulatae. *Corolla* tubulosa, lobis brevibus acutis papillois, 1.5-2 mm. longa, praesertim inferne papillis brevibus sparse instructa, ceterum glabra. *Antherarum* thecae 0.75-1 mm. longae, basi in caudam tenuem productae, connectiva apice supra thecas breviter producta, filamentis 0.5-0.75 mm. longis, *Stylus* in toto 1-1.75 mm. longus; stigmata apice papillato-penicillata, extra breviter papillosa; ovarium cylindrico-ellipsoideum, breviter denseque papillosum, 0.5 mm. longum. *Achaenia* matura non visa.

WESTERN AUSTRALIA. Swan River, in stony sandy places on higher ground, 22 Mar. 1839, *Preiss* 137 *; Swan River, 1844, *Drummond* 169; Wooroloo, Nov. 1907, *Koch* 1895 (type).

It is evident that Bentham looked upon the material of this species as being merely small-flowered specimens of his "*P. corymbulosa*". Detailed examination, however, shows that it differs from *P. pulchella* in numerous floral details apart from the size of the flower heads. In general organisation the species is clearly intermediate between *P. corymbulosa* proper, on the one hand, and *P. pulchella* on the other. The important distinctions are indicated in the diagnosis. From *P. melanostigma* Lewis & Summerh. it differs in the greater aggregation of the flower heads, the paler tips to the involucre bracts and the non-pigmented stigmatic arms, as well as in other minor features.

P. achilleoides is known with certainty only from the upper regions of the plateau inland from Perth. The specific epithet is given on account of the resemblance of the inflorescence to certain species of *Achillea*.

3. ***P. melanostigma*** *P. Lewis & Summerh.*, sp. nov.; a *P. achilleoides* *P. Lewis & Summerh.*, capitulis saepius solitariis, bracteis exterioribus apice pallidiore coloratis; a *P. pulchella* *Lindl.* capitulis dimidio minoribus, floribus paucioribus; ab utraque habitu minus erecta, stigmatibus nigro-papillatis distincta.

[*P. pulchella* (non *Lindl.*) *Steetz* in *Lehm. Pl. Preiss.* **1**, 446 (1845), in adnot.].

[*P. corymbulosa* (non *Lindl.*) *Benth.* *Fl. Austral.* **3**, 590 (1866), partim; *Diels et Pritz.* in *Engl. Bot. Jahrb.* **35**, 634 (1905); *Gardner*, *Enum. Pl. Austral. Occid.* 134 (1931), partim].

Herba verosimiliter annua, usque ad 45 cm. alta, e basi multiramosa. *Caules* basi sublignosi, saepius $\pm$ adscendentes, graciles, subflexuosi, teretes, usque ad 2 mm. diametro sed saepius multo tenuiores, inferne foliati, superne subnudi in inflorescentias transeuntes, primò lana tenui

*This appears to be the same gathering as that referred incorrectly to *P. corymbulosa* *Lindl.* by *Steetz*, but cited by him as No. 27. The description agrees and so do the other details of collection.

adpresso obtecti, demum $\pm$ glabrescentes. *Folia* sessilia, linearia ad anguste oblanceolata, apice acuta, basi $\pm$ angustata, 13–24 mm. longa, 1–2 mm. lata, superiora sensim decrescentia in bracteas inflorescentiae abeuntia, marginibus leviter revolutis, supra glabrata vel tenuiter lanata, subtus $\pm$ dense lanata. *Capitula* ad apices ramorum vel ramulorum suberectorum solitaria, inflorescentias laxae corymbosas formantia, 5–8 mm. diametro, 20–35-flora; receptaculum 2–2.5 mm. longum. *Involucrum* turbinatum; bracteae pluriseriatae, 35–70, infimae minimae, oblongo-lanceolatae, acutae, inferiores longiores, lanceolatae vel rarius oblanceolatae, mediocres oblanceolatae, marginibus leviter flexuosis, omniae superne rubro-brunneo-coloratae extra inferne breviter lanatae, superiores e basi angusta oblanceolatae, acutae, albae, superne radiatae, 5.75–6 mm. longae, superne 1.25–1.5 mm. latae, interdum marginibus leviter flexuosis, supremae (interiores) quam superiores breviores et angustiores, sed textura similes, subspathulato-oblanceolatae. *Corolla* tubulosa, lobis breviter acutis maturate $\pm$ recurvatis papillois, circiter 2 mm. longa, inferne papillis brevibus sparse instructa vel glabra. *Antherarum* thecae circiter 1 mm. longae, basi in caudam acuminatam productae, connectiva apice supra thecas breviter producta, filamentis circiter 0.75 mm. longis. *Stylus* in toto 1.5–2.25 mm. longus; stigmata extra dense nigro-papillosa; ovarium cylindrico-ellipsoideum, dense papillosum, 0.5–1 mm. longum. *Achaenia* matura non visa.

WESTERN AUSTRALIA. King George's Sound: in rocky hills, Dec. 1801, *R. Brown* 2260; no locality [probably at head of Kalgan and Hay rivers, 1835], *Roe* (Vienna herbarium, not seen); King George's Sound, Jan., Feb. 1854, *Harvey*; Mt. Clarence, King George's Sound, *Oldfield*; District South West Plantagenet, in scrub on damp hills not far from the sea, Jan. 1901, *Pritzel* 243 (type); Mt. Clarence, Albany, 120 m., yellow stony loam derived from underlying granite, spreading wiry herb 6 ins. high, rays white, some reddish brown on dorsal surface, 16 Apr. 1947, *Souster* 665.

This is rather like a small edition of *P. pulchella* in many respects, especially as regards the nature and arrangement of the capitula. It differs from all the other species, however, in the less erect growth, the main stem branching at the base into a number of rather slender ascending laterals. Floristically the species may be distinguished by the dark-coloured papillae on the outside of the stigmatic branches, the specific epithet being derived from this feature.

P. melanostigma is apparently quite isolated geographically from the rest of the genus, being restricted to an area in the vicinity of King George's Sound. The nearest known locality for any other species is Pinjarra, from which *P. pulchella* has been recorded. It remains to be seen if this isolation is confirmed when the intervening country has been more thoroughly explored botanically.

4. ***P. pulchella* Lindl.** in Edwards, Bot. Reg. App. vols. 1 23, p. xxiii (1839).

P. major Steetz in Lehm. Pl. Preiss. 1, 446 (1845).

[*P. corymbulosa* (non Lindl.) Benth. Fl. Austral. 3, 590 (1866), partim; Gardner, Enum. Pl. Austral. Occid. 134 (1931), partim].

WESTERN AUSTRALIA. Moore River, *Oldfield*; wooded plains above Guildford, in somewhat calcaerous gravelly soil, 9 Aug. 1839, *Preiss*, s.n.

(not seen) ; Greenmount, at foot of Darling Range, in gravelly soil, 24 Apr. 1901, *Andrews* 446 ; Bayswater, Lower Swan River, 14 Apr. 1899, *Morrison* 9227 ; Perth, N.E. of Highgate Hill, 1 June 1897, *Morrison* 7195 ; "Swan River", 1839, *Drummond* (type in Herb. Cantab.) ; "Swan River", *Drummond* 353 ; Buckland Hill, near Perth, on rocky limestone hills, 4 Jun. 1902, *Andrews* 447 ; Pinjarrah, Murray River, *Mueller*.

P. pulchella can be easily recognised on account of the large capitula, which may be so much as 15 mm. in diameter. Corresponding with this we find a greater number of bracts and of flowers than in any other species.

The species appears to be restricted to the coastal plain between the sea and the Darling Range escarpment. It is known from the Moore River in the north to Pinjarra in the south, but its true distribution may be more extensive. From the evidence available it appears likely that Preiss accompanied Drummond on the occasion when the latter collected the type specimen. It is therefore probable that the wooded plains above Guildford, mentioned on Preiss' label, are the type locality of *P. pulchella*.

Plant Hunting in Europe*—Lovers of alpine plants will read this little book with great interest and many will agree that as suggested in the foreword, Dr. Roger-Smith is undoubtedly the right man to act as our guide over the mountains and countries described. After giving details of how to collect and preserve the plants after collection the author proceeds to give an account of the various countries in Europe to which he has paid visits, with the names of the many interesting and beautiful plants to be found there. Switzerland, the Pyrenees, the Dolomites and Karawanken, Czechoslovakia, Yugoslavia, Greece and Cyprus are dealt with in turn and whether in the "Valley of Flowers" where the peculiar parasite *Lathraea clandestina* with its purple flowers grows so profusely, or among the ruins of Tyrens where the "dainty" *Iris Sisyrinchium* flourishes, our imagination is thrilled and our attention held by the delightful account of the happy hunting grounds of the alpine plant lover. After reading it one feels that the book is all too short, but as the author says his "personal experiences of plant-hunting do not pretend to be anything like a complete record of the plants of Europe". Nevertheless it will appeal to all those who appreciate the delights—and difficulties—of the plant hunter. One might mention that it is desirable for all books to bear the date of publication but unfortunately this book although recently received is undated.

H. S. MARSHALL.

*Plant Hunting in Europe. By H. Roger-Smith. Pp. 80 + 16 pls. (Alpine Garden Society). Bedford : Rush & Warwick (Bedford) Ltd. n.d. Price 5/-.

THE RUSTAM HERBARIUM, 'IRAQ. PART IV.

(Systematic List (continued)).*

BY R. A. BLAKELOCK.

PLANTAGINACEAE.

***Plantago albicans* L.**

Jabal Hamrin (nr. Injana), on light gypsiferous soil, 12.4.33, *Guest, Eig and Zohary* 5086.

The flowers of this specimen are somewhat smaller than is usual in this species, and the roots appear to be annual. In these characters it is matched by Mrs. V. Dickinson's material from Arabia and Lt. Col. Graham's specimen from Shargat, 'Iraq. Some Egyptian material in the Kew Herbarium is intermediate between these and the typical form.

P. boissieri Hausskn. et Bornm. is considered by Zohary to be a form of this species (l.c. infra 226).

***P. bellardi* All.**

Nr. Kirkuk, 300 m., on the road to Baba Gurgur oil wells on loose sandy soil, 4.4.31, 1366 ; Jabal Darawishka (nr. Khanaqin), 210 m., 28.3.32, 1789 ; Kani Dolman hills, Kirkuk, 390 m., on dry stony rounded hill-top, 30.4.33, 4311 ; Baba Gurgur (nr. Kirkuk), 315 m., on light red soil by sandstone outcrop, 16.4.33, *Guest, Eig and Zohary* 5105.

***P. coronopus* L.**

Jabal Hamrin, 150 m., on sandy calcareous soil among rocks, 6.4.31, 1424 ; Diwaniya (Hor-ad-dukn), on irrigated land, fodder plant, eaten by sheep, camels and water-buffaloes, native name 'anaik', 14.4.32, *Sirkal Mhd. Ali* 2370 ; Daltawa, in cultivated fields and on the dry edges of marshy patches or "jawarib" or "hor" land (i.e. low-lying land liable to flooding), native name 'anaij', 26.5.32, 2443 ; do., one of the best grazing plants for sheep, 29.4.32, 2443 A ; Baghdad, in fields at Rustam, 25.4.33, *Yussef Lazar* 3912.

***P. cretica* L.**

Ain Sifni (Mosul Liwa), 450 m., on fallow land, good fodder plant, native name kia'ai hor (K.), 9.6.32, *Salim Effendi* 2561.

***P. lagopus* L.**

Rustam Farm, nr. Baghdad, Apr. 33, *Yussef Lazar* 35b ; Kut, Sept. 29, 200 ; Kifri, along edge of millstream, Mar. 30, 375 ; Sumaicha (nr. Samarra), Feb. 30, 387 ; Rustam, foot of Jabal Hamrin, 21.3.30, 508 ; Mandali, cultivated fields, May 30, 882 ; nr. Felluja, cultivated land, native name adhain-as-sakhait, 6.3.30, 963 ; Rustam, 19.3.32, *Yussef Lazar* 1140A ; Dohuk, 350 m., in cultivated fields, 1.4.31, 1298 ; Qizil Robat, at edge of a cornfield, eaten by sheep, native name zebad, 28.3.32, 1767 ; Daltawa, in cultivated fields, eaten by sheep, 29.4.32, *Darwish Hadari* 2634.

***P. lanceolata* L.**

Kirkuk, on banks of a millstream, 22.3.30, 537 ; Rustam, in barley fields, 19.3.32, *Yussef Lazar* 1140 ; Mandali, in a cornfield, native names zibad or idhan-as-sakhailah (= "goat's ears"), 26.3.32, 1807 ; Tanjero Valley (Sulaimaniya), on "daim" and watered land throughout the

*Continued from Kew Bull. 1948, 375-444 (1948) ; 1949, 41-65 (1949) ; 1949, 517-553 (1949)

province, spring and summer plant eaten by all animals, used for making poultices for humans, native name rikesha, 18.4.32, *Gowan* 2424; Daltawa, in a cornfield, native names zibad or adhan-as-sakhailah, 26.3.32, 2463; Hilla, on daim (unirrigated) land generally but this specimen was from an irrigated field, eaten by most animals, native name zibad, 28.5.32, *Civil Vet. Surgeon of Hilla* 2517; Rowanduz Gorge, 440 m., among stones by a waterfall pool, 17.7.32, 3017; Seri Hassan Beg, 1800 m., at the edge of a cornfield, 24.7.32, 3023; Rustam, in a channel, native name zowait, 7.5.32, *Yussef Lazar* 3426; Baghdad, on channels in the orchard, native names zibad or zowait, 5.4.33, *Yussef Lazar* 3911.

***P. loeflingii* L.**

Shargat (on ancient mound at Ashur), Mar. 30, 399; Latifiya Estate (nr. Mahmudiya), very common in linseed fields (on light sandy soil) on land cropped for first time which had been barren desert for many years before (cf. adjoining unirrigated land), seed must have been brought down by irrigation water, 23.3.32, 1681; Qizil Robat, in a cornfield, native name zibad, eaten by sheep, 28.3.32, 1765.

***P. major* L.**

Daltawa, in a ditch in the shade of a date garden, used for application to boils, native name bizr dinbil (= "boil seed"), 26.5.32, 2455; Zawita, Kurdistan, 900 m., in ditches in gardens used for treating boils, 27.7.33, 3753.

***P. notata* Lag.**

Shargat (on ancient mound at Ashur), Mar. 30, 399A; Salman Pak (nr. Ctesiphon), on unirrigated pasture land, grazed by sheep and other animals, native name zibad, 4.3.32, *Su'ud al Dhahir* 1947.

Zohary considers *P. haussknechtii* Vatke and *P. phaeopsis* Payne to be synonyms of *P. notata* in "On the *Plantago* Species of the Near East" in Pal. Journ. Bot. J. Ser. 1, 227 (1938). Bornmüller took the same view in Verh. zoo.-bot. Ges. Wien. 48, 625 (1898).

***P. ovata* Forsk.**

Shargat (on ancient mound at Ashur), Mar. 30, 399; Jabal Hamrin nr. Injana, 29.3.30, 692; Jabal Hamrin, loose sandy calcareous soil pockets among rocks at Injana, 150 m., 6.4.31, 1426; Jabal Darawishka, 210 m., on stony land, eaten by sheep, native name zibad, 29.3.32, 1845; Zubair (Basra), in sandy desert on the 'Iraq-Nejd frontier, spring fodder plant, native name riblah, 4.5.32, *Abdul Wahab Mustafa* 3162; Jazira Desert, 20.4.33, *Edmonds* 3815; Southern Desert, W. of Zubair, on compact sandy soil, covered by small stones and grit, 8.4.33, *Guest, Eig and Zohary* 5039.

***P. psyllium* L.**

Dohuk, 450 m., in cultivated fields, 1.4.31, 1304; nr. Kirkuk, 300 m., on the road to Baba Gurgur oil wells (sandy soil), 4.4.31, 1362; Tursak, Mandali, native name zibad, 26.3.32, 1738; Dohuk, native name gia barakh (K.), 2.6.32, *Mekki Beg* 3263; Balad Sinjar, 429 m., on roadside grazing strip, 28.4.33, 4102; Balad Sinjar-Tal Afar, 330 m., 28.4.33, 4153; Ain-al-Husan (nr. Sinjar), 315 m., on open *Poa* steppe, 28.4.33, 4234; Kani Dolman hills, Kirkuk, 390 m., on dry stony rocky hill-top, 30.4.33, 4312.

***P. saxatilis* MB.**

Chia-i-Mandali, 2700 m., on the rocky mountain side, 19.7.32, 2711;

Arl Gird Dagħ, 3000 m., by a melting snowdrift, 21.7.32, 2835 ; do., 3000-3600 m., on the rocky mountain side, 22.7.32, 2856.

Plantago sp.

Nr. Felluja, on haswah land, 6.3.30, 958.

Material too young for more accurate determination.

Since Boissier's key (Fl. Or. **4**, 877-878 (1875)) is somewhat confusing, and Zohary in " On the Plantago Species of the Near East " in Pal. Journ. Bot. J. Ser. **1**, 227 (1938), gives neither key nor descriptions, a field key to the species of *Plantago* found in 'Iraq is given here.

A. Leaves radical, plant rarely shortly caulescent and then leaves alternate

B. Leaves ovate, glabrous to pubescent. Perennial . . . *major* L.

BB. Leaves generally lanceolate to linear (if ovate then long and densely pilose). Perennial or annual

C. Bracts $\pm$ as long as calyx. Spike and leaves various

D. Bracts acuminate or acute

E. Bracts glabrous. Generally perennial . . . *lanceolata* L.

EE. Bracts long pilose or lanate. Annual

F. Leaves and peduncles glabrescent or sparsely pilose, leaves dentate generally shorter than scape, peduncles not recurved in fruit *lagopus* L.

FF. Leaves and peduncles with dense spreading hairs or lanate, leaves entire generally longer than scape, peduncles recurved in fruit

G. Corolla lobes lanceolate ; spike ovate or oblong, villose *bellardi* All.

GG. Corolla lobes ovate ; spike globose, lanate

cretica L.

DD. Bracts obtuse or rounded

H. Bracts glabrous or glabrescent

I. Corolla lobes ovate, c. 2 mm. long *ovata* Forsk

II. Corolla lobes lanceolate, c. 1 mm. long *loeflingii* L.

HH. Bracts densely hairy or long pilose on margins

J. Corolla lobes ovate, leaves entire or not.

Annuals or perennials

K. Corolla lobes obtuse, bracts lanate, leaves with few narrow outgrowths, rarely pinnatifid. Annual

notata Lag.,

(*haussknechtii* Vatke, *phaeopsis* Payne)

KK. Corolla lobes acute or acuminate, bracts shortly pilose or glabrescent on back, margins pilose, leaves entire or dentate or with outgrowths. Perennials (sometimes annual in *P. albicans* ?)

L. Leaves adpressed pilose to glabrescent, spike ovate to oblong-cylindric dense. Alpine plant

saxatilis M.B.

LL. Leaves densely sericeo-lanate, spike linear to cylindric often subinterrupted at base. Lowland plant *albicans* L.

(*boissieri* Haussk. et Bornm.)

JJ. Corolla lobes lanceolate, leaves entire. Annuals

M. Corolla glabrous, leaves linear-lanceolate to lanceolate
cylindrica Forsk.

MM. Corolla lobes with conspicuous hair on the back,
 leaves spathulate-ovate to spathulate-lanceolate
ciliata Desf.

CC. Bracts shorter than calyx, acute or acuminate, linear spike up
 to 4 mm. wide, leaves generally pinnatifid *coronopus* L.

AA. Leaves cauline, opposite *psyllium* L.

The following subspecies and varieties are listed by Zohary (l.c.)—

P. cylindrica subsp. *mesopotamica* Zohary p. 225.

P. cylindrica var. *micropodiodes* Zohary p. 226.

P. ovata Forsk. var. *decumbens* (Forsk.) Zohary p. 227.

P. coronopus L. var. *crassipes* Coss. et Dav. in Bull. Soc. Bot. France, **36**,
 106 (1889).

Boissier (Fl. Or. **4**, 881) records *P. lanceolata* var. *eriophylla* Decne. from
 Kurdistan.

Nábělek in Publ. Fac. Sci. Univ. Masar. **105**, 6 (1929) described as new
P. thrichophylla from S.W. Persia very near the 'Iraq border. No speci-
 mens of this have been seen ; from the description and figure it is possibly
 a depauperate form of *P. ovata*.

NYCTAGINACEAE.

Bougainvillea spectabilis Willd.

Gardens at Basra, Oct. 29, 285.

ILLECEBRACEAE.

Herniaria hemistemon J. Gay.

Chuwaiba Wells, nr. Zubair, on sandy soil in slight depression, 8.4.33,
Guest, Eig, & Zohary 5047.

H. hirsuta L.

Nr. Mahmudiya (Latifiya Estate), native name shuwail, 16.5.31,
 2390 ; Baghdad, in field at Rustam, native name shuwail, 25.4.33, *Yussef*
Lazar 3890 ; Ain Ghazal (Mosul Province), 360 m., in a field, 28.4.33,
 4075A.

Paronychia arabica (L.) DC.

Zubair, on somewhat compact sandy soil near cultivated area of
 "sulbiyah" (i.e. *Tamarix* groves, interplanted with other crops when
 young and irrigated by wells—in desert), 8.4.33, *Guest, Eig and Zohary*
 5014.

P. kurdica Boiss.

Khanaqin, 210 m. on bare ledges of rock, tufted plant forming a low
 flat mat on the rock face, 29.3.32, 1834 ; Tauq Chai, 210 m., in the dry
 stony torrent bed, 16.4.32, 1975 ; nr. Shaikh Adi (N. of Mosul), 750 m.,
 on rocks, 14.7.33, 3660 ; Amadia, Kurdistan, c. 1500 m., on rocks in
 Mazurka Gorge, 3780 ; Kani Dolman hills, Kirkuk, 390 m., on dry
 stony rounded hill-top, 30.4.33, 4359.

Pteranthus dichotomus Forsk. (*P. echinatus* Desf.).

Jabal Hamrin, 29.3.30, 671, 680 ; do. (nr. Injana), 150 m., 6.3.31,
 1422 ; Baba Gurgur, nr. Kirkuk, 315 m., on light red soil outcrop,
 16.4.33, *Guest, Eig and Zohary* 5107.

AMARANTHACEAE.

Amaranthus angustifolius L. subsp. **graecizans** (L.) Thell. in A. & G. Syn. 5, 307 (1914) det. N. Y. Sandwith.

Rustam, July 29, 168 ; Nasiriya, in irrigated fields and gardens, eaten by all animals, native name sarmaq, 18.4.32, *Abd-ar-rizaq Barbuti* 2538 ; Aziziya, in a *Sorghum* field, on channels, cooked and eaten as a vegetable by the peasants, native name sarmaq, 17.7.32, 3475 ; Hit, in a date garden, native name urf-ad-dik, 15.10.32, 3528.

A. gracilis Desf. det. N. Y. Sandwith.

Hit, in a date garden, 14.10.32, 3527.

A. retroflexus L. det. N.Y.S.

Dabouni, Sept, 29, 218 ; Rowanduz Gorge, 600 m., on the stony hillside, 25.7.32, 2981 ; Baghdad (Harathiya Estate), by a saline seepage pool near a canal, native name lizajj (?), 14.7.32, 3237 ; Zawita, 900 m., gardens, native name bunsorg (K.), 27.7.33, 3746.

Amaranthus is dealt with by Thellung in Ascherson and Graebner Syn. Mitteleur. Fl. 5, 225-354 (1914).

CHENOPODIACEAE.

Atriplex leucolada Boiss. subsp. **turcomanica** (Moq.) Aellen in Engl. Bot. Jahrb. 70, 23 (1939).

In the Jazira (Wadi Tharthar), at the edge of a sulphurous spring, forming a small bush, native name rug hul, 15.10.32, 3520 ; Aziziya, in a *Sorghum* field, bushy plant with woody stems, 6.10.32, 3570.

Aellen (l.c. 1-66) gives a revision of the Oriental species of *Atriplex*.

A. nummularium Lindl.

Rustam (alien), cultivated as a fodder plant for introduction originally from Australia, 20.2.32, 3313, 3314.

A. tartarica L. ?

Hilla, on daim (unirrigated) land, grazed by sheep, cattle, camels and horses, native name rug hul, 28.5.32, *Civ. Vet. Surgeon of Hilla* 2012 ; Daltawa, eaten by all animals, also used as a remedy for " khuzai brah " poisoning, native name rug hul or hamadh, 26.5.32, 2450 ; Baghdad, in fields at Rustam, native name rug hul-al-barriya, 25.4.33, *Yussef Lazar* 3905.

These specimens bear no fruit.

Bassia eriophora (Schrud.) Aschers.

S. of Mandali-Kabal Tahlao Nukta, 10.5.30, 788 ; Babylon, among the ruins in depressions, native name alaich-al-ghazal, 23.3.32, 1682 ; Baghdad, in depressions at Rustam, native name qutainah, 21.5.33, *Yussef Lazar* 3926.

B. hyssopifolia (Pall.) Kuntze.

Diwaniya, in a thicket near the river, native name suād or arid, 8.10.32, 3565.

Beta maritima L.

Rustam, May 29, 265 ; Shamiya, fodder plant, native name milaih, June 32, *Qaimaqam of Shamiya* 2357 ; Daltawa, on salty land, native name silaijah (= " little spinach "), 26.5.32, 2513 ; Rustam, 7.5.32, 1.6.32, *Yussef Lazar* 3440, 3441 ; Baghdad, in fields at Rustam, native name hummaidh, 25.4.33, *do.* 3908.

B. vulgaris L.

Rustam, Apr. 30, 249.

Beta sp.

Rustam, cultivated in gardens as a vegetable, leaves eaten like spinach, 17.5.32, 1776.

Cornulaca aucheri Moq. det. B. L. Burt.

By the Habbaniya Lake, on highly gypsiferous pebbly sandstone, native name hāthah, 14.10.32, 3533; Hatra, on mounds among the ruins, eaten by sheep and camels, 16.10.32, 3534.

3533 is a form with a short fruit spine (2 mm.).

C. aucheri Moq. ? det. B. L. Burt.

Makatu nr. Mandali, 11.5.30, 878; Latifiya Estate, 24.9.30, 927; Ghurfa Plain, nr. Injana, Jabal Hamrin, sandy soil, native name hathah, 7.7.33, 4008.

C. monacantha Del. det. B. L. Burt.

By the Habbaniya Lake, on highly gypsiferous pebbly sandstone, native name sha'rān or ubairah, 14.10.32, 3535.

Chenopodium album L. (*Chenopodium* det. J. P. M. Brenan).

Baghdad (Harathiya Estate) by a seepage pool (saline water) near a canal, eaten by sheep, native name hāmidh, 14.7.32, 3233, 3234, 3235.

C. botrys L.

Nr. Aradin (Amadia Valley), 1050 m., by the roadside, 3.8.33, and cult. Kew, 26.7.34, 4999.

C. ficifolium Sm.

Rustam, in gardens, orchards, etc., native name jināh-al-ghurāb, 7.5.32, *Yussef Lazar* 3435.

C. foliosum (Moench) Aschers. (*Blitum virgatum* L.).

Arl Gird Dagh, 3000 m., among rocks, 22.7.32, 2862; do., 2400–2700 m., among rocks by a lake, fruit eaten by Assyrians, 24.7.32, 2942.

C. murale L.

Rustam, July 29, 170; Baghdad, in cultivated fields, 28.1.31, 1106.

C. opulifolium Schrad.

Baghdad (Harathiya Estate), by a saline seepage pool by a canal, 14.7.32, 3234A; Shaikh Adi, 900 m., by a stream, 14.7.32, 3671.

C. vulvaria L.

Zawita, 990 m., on rocky cliff near the village, 30.7.33, 4838.

Halocharis sulphurea Moq.

Nr. Tuz, on edge of a salt marsh, 29.3.30, 666.

Halocnemum strobilaceum (Pall.) M. Bieb.

In the Jazira, in the open bed of the Wadi Tharthar near Sabka Um Rahal, native name thilaidh, 15.10.32, 3544; Hit, in a wet salt marsh, reddish-green, 15.10.32, 3547.

Haloxylon articulatum (Cav.) Bunge subsp. **ramosissimum** Eig in Pal. Journ. Bot. J. ser. 3, 128 (1945).

In the Jazira, in open gypsum desert near Haditha, native name yathnah, 15.10.32, 3519.

H. salicornicum (Moq.) Bunge.

By Habbaniya Lake, on highly gypsiferous pebbly sandstone, native name rimth or thilaidh, 14.10.32, 3540; 'Iraq-Nedj frontier in sandy desert near Zubair (Basra), one of the principal fodder plants eaten by camels, both green and dry, used also for fuel, native name rimth or hamdh, 4.5.32, *Abdul Wahab Mustafa* 3154.

3154 is too poor a specimen to be identified with certainty.

Noea mucronata (Forsk.) Asch. et Schw.

Hatra, on mounds by the ruined walls, eaten by sheep and camels, flowers reddish and whitish, native name sirr, 16.10.37, 3553 ; Ghurfa Plain nr. Injana, Jabal Hamrin, sandy soil, 7.7.33, 4007.

Panderia pilosa F. et M.

Baghdad (Harathiya Estate), by a saline seepage pool near a canal, native name hamīdh, 14.7.32, 3230, 3231.

Salicornia europaea L. var. **herbacea** L. s. l. in Sp. Pl. 1, 3 (1753).

Hit, in a wet marsh, green, eaten by camels, etc., native name thilaidh, 3546.

Salsola hierochuntica Bornm. det. B. L. Burtt.

Hatra, on mounds of the ancient walls, 16.10.32, 3536.

S. pestifera A. Nelson.

Nr. Amara, common along dry channels bordering the Majar canal, native name chibchab, 14.12.31, 1633 ; Rustam, on river banks, native name suwād, 29.10.32, *Yussef Lazar* 3588 ; Baghdad (Harathiya Estate), by a saline seepage pool near a canal, 14.7.32, 3232.

S. subaphylla C. A. Mey. det. B. L. Burtt.

By Habbaniya Lake, on highly gypsiferous pebbly sand-stone, native name bū'aīdh, 14.10.32, 3537.

S. vermiculata L. subsp. **villosa** (Moq.) Eig in Pal. Journ. Bot. J. Ser. 3, 132 (1945).

In the Jazira, in open depressions near the Wadi Tharthar, native name khudhrādh, 15.10.32, 3515 ; Diwaniya, in a thicket near the river, native name qurait (?), 8.10.32, 3564.

The leaves have fallen off these specimens, but they appear to be this species.

Seidlitzia rosmarinus (Ehrenb.) Bunge.

In the Jazira, in the open bed of the Wadi Tharthar nr. Sabka Um Rahal, 15.10.31, 3545.

Suaeda baccata Forsk. (*Schanginia baccata* (Forsk.) Moq.).

Dabouni near Kut, native name tartai', Sept. 29, 191 ; Hilla, fodder plant, native name tartai', Aug. 32, *Civ. Vet. Surgeon of Hilla* 2519A ; Hilla-Diwaniya, on waste land by fields, etc., small vivid green tufted bushes, 15.8.32, 3169 ; Kut, in vegetable gardens near the river, eaten by camels, native name tartai', 15.9.32, *Yussef Lazar* 3487 ; in the Jazira, by a sulphurous spring in the Wadi Tharthar, native name hamudh, 15.10.32, 3550.

Ulbrich in Pflanzenfam. 16c, 558 (1934) regards *Schanginia* as a section of *Suaeda*, not as a separate genus.

S. mesopotamica Eig. e descr. ?

Hafariya (Kut Liwa), 7.10.30, 1035 ; Nasiriya, widely distributed on daim land, native name hamudh, June 32, *Civ. Vet. Surgeon of Muntafiq Liwa*, 2531A.

S. vermiculata Forsk.

Nr. Amara, large tufted bush very common, native name tahāmah, 14.12.31, 1635 ; Diwaniya, on marshy bank of Euphrates, bushy tufted plant with succulent bulbous leaves, native name 'arid (?), 2395 ; nr. Dabouni (Kut), on desert land near the river, low bushes 2-3 ft. high forming small mounds, 17.9.32, 3469.

Suaeda *sp.*

Nasiriya, widely distributed in the province on cultivated and daim (unirrigated) land, grazed by sheep and more specially by camels, local herdsmen say that the camels get scab if this plant is absent from their diet, native name hamudh. 15.4.32, *Abd-er-Rizq Baran* 1531; Dahrwa, eaten by sheep, camels, etc., native name tartal, 26.5.32, 2451.

POLYGONACEAE.

[**Atraphaxis spinosa** L. var. **glauca** Boiss. Fl. Or. 4, 1021 1879.]

Upper Alamut Valley, Persia, 2400–3000 m., low shrub about 2 ft. high on stony ground, Aug. 1931, *Stark* 1603.]

Emex spinosus (L.) Campd.

Southern desert, W. of Zubair, compact sandy soil, covered by small stones and grit, 8.4.33, *Guest, Eig and Zohary* 5018, 5038.

Oxyria digyna (L.) Campd.

Arl Gird Dagh, 3000 m., by a melting snow drift, 22.7.32, 2838; do., 3300 m., among rocks, 22.7.32, 3068.

Polygonum alpestre C.A.M.

Arl Gird Dagh, 3000 m., on rocky ground, 22.7.32, 2864.

P. amphibium L.

Seri Hassan Beg, 1800 m., in a ditch by a cornfield, flowers bright pink, 24.7.32, 3025.

The terrestrial form.

P. argyrocoleon Steud.

Rustam, May 29, *Rogers* 266; nr. Baghdad, July 29, 174; Basra, Oct. 29, 302; Rustam, in fields, ditches, etc., native name muwassalah, 15.5.31, 1174; Rustam, 4.5.31, *Yussef Lazar* 1174A; Bad'a (N. of Baghdad), native name massalah, 26.5.32, 2503; Hilla, on daim or irrigated land, eaten by most animals—horses, sheep, cattle, etc., native name muwassalah, 28.5.32, *Civ. Vet. Surg. of Hilla* 2526; Ariciva, in a *Sorghum* field (especially in ditches, etc.), native name massalah, 17.10.32, 3472; nr. Aradin (Amadia Valley), 1050 m., by the roadside, 3.8.33, 4998.

P. aff. argyrocoleo Steud.

Seri Hassan Beg, 1800 m., on stony ground, 24.7.32, 3020.

The fruit are as smooth as in type material of *P. argyrocoleon*. The perianth is more petaloid than in *P. argyrocoleon*. The leaves are larger than in *P. arenarium* W.K. Possibly a hybrid of *P. argyrocoleon* and some species with a more petaloid perianth.

P. aviculare L. s.l.

Baghdad, by a saline seepage pool near a canal, 14.7.32, 3226.

P. bellardi All.?

Baghdad, in cultivated fields, 28.1.31, 1102.

Material too immature for more accurate identification.

P. bistorta L. var. **angustifolium** Meisn. ex DC. Prodr. 14, 125 (1856).

Arl Gird Dagh, 3000 m., by a lake in wet places, 22.7.32, 2863.

P. corrigioloides Jaub. et Spach.

Mahmudiya, 22.5.30, 923; Mahmudiya, cultivated field on Latifiya Estate, 16.5.32, 2394.

P. equisetiforme Sibth. et Sm.?

Rustam, May 29, *Rogers* 266.

The specimen shows no fruits, but is probably this species.

P. lapathifolium L. var. **incanum** (Schmidt) Lej. et Court. Comp. Fl. Belg. 61 (1831).

Diyala River at Rustam, on mud flats left by the receding river in autumn, 24.8.32, 3503.

P. paronychioides C.A.M.

Chusi Mandali, 2700 m., on top of the ridge among rocks, 19.7.32, 2710.

P. salicifolium Brouss. ex Willd. (*P. scabrum* Poir., *P. serrulatum* Boiss.).

Basra, October 29, 1903, Amara marshes, growing in shallow water, common grazing plant for water buffaloes, native name qal, 11.12.31, 1621; 'Abu m. Abadan, on mud flats at the edge of the creek, 16.12.31, 1627.

Polygonum scabrum Poir. (1804) is a later homonym for *P. scabrum* Moench. (1794), a synonym of *P. lapathifolium* L.

Rheum ribes L.

Marmarut Mt. (Kowaduz Area), 1200 m., eaten by the Kurd. like rhubarb, 19.4.32, 2624.

Rumex conglomeratus Murr.

Daltawa, in a vegetable garden, native name humaidh, 26.5.32, 2456; Zawita, 900 m., in gardens, native name tirshok (K.), 27.7.33, 3745.

R. crispus L.

Seri Hassan Beg, 1800 m., in a ditch in a cornfield, 24.7.32, 3027.

R. cyprius Moench subsp. **disciformis** Samuelson in Bot. Notes 312 (1939). (*R. roseus* L. sec. Boiss. et auct. al.).

Jabal Hamrin (nr. Injana), 150 m., on sandy soil among rocks, 6.3.31, 1323, 1425; Jabal Hamrin, 150 m., in sandy sandstone pockets between cliffs in the rock, 23.3.32, 1814; Jabal Hamrin (nr. Table Mt.), 150 m., on sandy soil, 15.4.32, 2622.

R. dentatus L. subsp. **mesopotamicus** Rech. f. in Belth. Bot. Congr. 49, abt. II, 15 (1932).

Hosad-duz, Diwanliya, on irrigated land, fodder plant eaten by sheep, 14.4.32, Fakal Mohammed Ali of Muorah Estate 2372; Daltawa, native name humaidh, 26.5.32, 2456A; Baghdad (Harathiya Estate), by a talline sedge pool near a canal, 14.7.32, 3233; Rustam, native name anfad-dik, 15.3.32, Yusuf Lazar 3436; Diyala River at Rustam, on mud flats left by receding river in autumn, 24.9.32, 3502; Azaziya, along stream in a sorghum field, 6.10.32, 3546; Baghdad, fields at Rustam, native name humaidh, 25.4.33, Yusuf Lazar 3907.

R. aff. pontico E. H. L. Krause emend. Rech. f.

Ard Gird Dagh (nr. Rust), 2400 m., among rocks, 24.7.32, 2930.

The local form of this specimen is markedly concave. In the key to the subgenus of *Rumex* by Rechinger & in Fidei Rep. Sp. Nov. 31, 223-233 (1941), our specimen comes under *R. pontico* which is described as convex, the leaves concave back to the petiole leaves. The fruit is like that of *R. ponticus* (Sinter's 7072).

R. pulcher L. subsp. **anodontus** Hayek, Rech. f. 1, 34.

Kowaduz Gorge, 540 m., by a stream, 17.7.32, 3013.

R. scutatus L.

Jabal Hamrin (nr. Seri Hassan Beg), 2400 m., among rocky soil among

on the stony mountain side, 24.7.32, 2901 ; do., forming beautiful clumps of a delicate pink colour, 2904.

Rumex sp.

Suwara Tukka (Kurdistan), 1050 m., 10.10.31, 477.

This specimen shows fruit, but no leaves. Probably a hybrid.

ARISTOLOCHIACEAE.

Aristolochia maurorum L.

Sulaimaniya-Kirkuk, in waste places up to 900 m., 30.3.32, *Ludlow-Hewitt* 1932 ; Zawita Gorge, 900 m., 23.4.32, 2203 ; Dohuk, 450 m., in a cornfield on stony land, deep underground woody rhizome, 24.4.32, 2235 ; Dohuk, chiefly on plain, useful for sheep grazing, roots used as medicine for sheep and cattle, native name ratl sak (K.), 5.5.32, *Mekki Beg* 3253 ; nr. Kirkuk, 420 m., on bare denuded hills, 13.4.33, *Guest, Eig and Zohary* 5100.

A. maurorum L. var. **latifolia** Boiss. Fl. Or. 4, 1080 (1875).

Razinook (nr. Rowanduz), Kurdistan, c. 900 m., 10.5.33, *Cuckney* 3840.

THYMELEACEAE.

Daphne acuminata Boiss. et Hoh.

Kurdish hills, 1200–1800 m., shrubs, very sweet scented with red berries, Aug. 31, *Ludlow-Hewitt* 1517 ; Chia-i-Mandali, from Walza-Walash, 1200–1800 m., on the mountain side, a very common shrub at this altitude, used by the Assyrians as a cure for rheumatism, chopped branches boiled in water and the decoction applied to the place, 18.7.32, 2675 ; Ser Amadia, 1800 m., on top of the ridge, 3.8.33, 4987.

Lygia passerina (L.) Fasano.

Kani Dolman hills, Kirkuk, 390 m., on dry stony rounded hill-top, 30.4.33, 4360 ; Balad Sinjar-Tal Afar, 330 m., on semi-natural steppe, 28.4.33, 4169.

4169 shows no flowers nor fruits, but appears to be this species.

ELAEAGNACEAE.

Elaeagnus angustifolia L.

Baghdad, cultivated, 21.5.33, 3879.

LORANTHACEAE.

Loranthus europaeus L.

Marmarut Mt. (nr. Rowanduz), 1200 m., parasitic on oak (see 2064A *Quercus aegilops*), 19.4.32, 2064 ; Suwara-Tukka, N. of Dohuk, Kurdistan, 10.10.31, 1590.

SANTALACEAE.

Thesium sp.

Zawita, 1230 m., in open oak forest, 30.7.33, 4860.

The specimen is too poor for more accurate determination.

EUPHORBIACEAE.

Andrachne aspera Spreng.

Dohuk Gorge, 450 m., on a limestone cliff, 25.7.33, 3704.

A. telephioides L.

Nr. Rustam, Aug. 29, 162 ; Rustam, on dry ground in a yard, 16.6.31, *Russef Lazar* 1187 ; do., Rustam, native name lammah, 31.10.32, do. 1187A ; Daima nr. Mandali, 26.3.32, 1726 ; Jabal Hamrin (nr. Table Mt.), 150 m., growing from a crack on a rocky slab, 30.3.32, 1895 ; Bad'a (N. of Baghdad), on sandy loam in a vegetable garden, native name

lāmah, 26.5.32, 2500 ; in the Jazira, in small depressions on gypsum desert, native name lāmah, 17.10.32, 3514 ; Hatra, among the ruins, native name lāmah, 18.10.32, 3560 ; Aziziya, in a *Sorghum* field, 6.10.32, 3573 ; Kirkuk Province, useful grazing plant, native name wasmiyah, 13.5.33, *Ali Effendi Hadari* 3931 ; Ain-al-Husan (nr. Sinjar), 315 m., on open *Poa* steppe, 28.4.33, 4201.

Chrozophora verbascifolia (Willd.) Juss.

Rustam, 2.6.31, *Yussef Lazar* 92 ; do., July 29, 166 ; nr. Dohuk, 600 m., by a roadside, 10.10.31, 1668 ; Rowanduz Gorge, 600 m., on the mountain side, 25.7.32, 2983 ; Arbil, 540 m., on stony red loam in cultivated fields (fallow), 17.7.32, 2999.

Euphorbia aleppica L.

Mosul to Ain-Sifni, 360 m., fields, 11.7.33, 4034A.

E. chamaesyce L.

Rustam, 2.6.31, *Yussef Lazar* 1189 ; Bada' (N. of Baghdad), on sandy loam in a vegetable garden, native name lāmah, 26.5.32, 2499.

E. chamaesyce L. var. **canescens** (L.) Boiss. ex DC. Prod. **15**, pt. 2, 35 (1862).

Haditha, in fields and gardens, native name albainah, 15.10.32, 3517 ; Al Qosh, 450 m., in a *Sorghum* field, 15.7.33, 3679.

E. condylocarpa M.B.

Rowanduz Gorge, 750 m., 18.4.32, 2100.

The root of *E. condylocarpa* is described by Boissier Fl. Or. **4**, 1102 (1879) as ovate-globose. In Guest's specimen it is a long tapering fusiform structure. Intermediates below the two shapes are shown in some of the other material in Herb. Kew.

E. cornuta Pers.

Southern Desert nr. Jaliba, on hard sandy soil strewn with pebbles in *Haloxylon* association, 8.4.33, *Guest, Eig and Zohary* 5068.

E. denticulata Lam.

Amadia, 900–1800 m., native name shîri mār, 28.3.31, 1212 ; Chia-i-Mandali (nr. Walza), 1950 m., on the stony hillside, 18.7.32, 2695.

E. falcata L.

Haditha, along a water channel in a dukhn [millet] field, 15.10.32, 3523 ; Baghdad, in date gardens at Karada, May 33, 3878 ; Southern desert (near Jaliba), on hard sandy soil strewn with small pebbles in an *Haloxylon* association, 8.4.33, *Guest, Eig and Zohary* 5070.

E. falcata L. var. **ecornuta** Boiss. Fl. Or. **4**, 1111 (1879).

Daltawa, in an onion field, used for eyes of sheep, etc., native name dawa' ghanam (?) (= "sheep medicine"), 26.5.32, 2482 ; Dohuk to Mosul, 360 m., fields, 21.7.33, 3683 ; Mosul to Ain Sifni, 360 m., fields, 11.7.33, 4036 ; Balad Sinjar–Tal Afar, 330 m., on semi-natural steppe, 28.4.33, 4171.

E. falcata L. var. **rubra** (Cav.) Boiss. Fl. Or. **4**, 1111 (1879).

Almost certainly collected near Mosul or Kirkuk, 270.

E. granulata Forsk.

Aziziya, on saline ground in a *Sorghum* field, flat spreading plant, 17.9.32, 3470 ; Kut, in vegetable gardens, native name um-al-halib, 17.9.32, *Yussef Lazar* 3482 ; nr. Fatta Gorge, in small sandy patches round *Zizyphus* bushes in open desert, native name albainah, 18.10.32, 3513 ; Aziziya, in a *Sorghum* field, 6.10.32, 3572.

It seems doubtful if *E. turcomanica* Boiss. is really distinct from this species.

E. granulata Forsk. var. **glabrata** Boiss. ex DC. Prodr. **15**, pt. 2, 34 (1862).

Kut, Sept. 29, 195 ; Aziziya, in a *Sorghum* field, 17.10.32, 3471.

E. guestii Blakelock sp. nov. (Sect. *Galarrhei* Boiss. : *E. gaillardoti* Boiss. et Blanche pro parte) ; ab *E. gaillardoti* bracteis foliaceis latitudine longioribus basi rotundatis, seminibus foveolatis cinereis, inflorescentia corymboso-umbellata distinguitur.

Herba annua 18–36 cm. alta. *Caulis* 8–24 cm. longus, 2–6 mm. latus, crassus vel crassiusculus, striatus, glaber, in sicco luteo-virescens. *Folia* caulina plerumque evanida, lineari-spathulata vel lanceolato-spathulata, glabra, margine integra apicem versus minute denticulata, usque 2.5 cm. longa, 0.9 cm. lata. *Inflorescentia* irregulariter corymboso-umbellata, radiis 4–11. *Inflorescentiae rami* crassiusculi, striati, glabri, in sicco luteo-virescentes, 6.5–27 cm. longi, c. quinquies dichotomi. *Bracteae foliaceae* ovato-orbiculares, subcoriaceae, glabrae, subtus in sicco $\pm$ purpureo-suffusae, apicem versus denticulatae, apicem carinato-mucronatae, basi rotundatae, 22–3 mm. longae, 15–4 mm. latae. *Cyathium* 2 mm. longum, glandulis transverse trapezoideo-ellipticis. *Capsula* globoso-tricocca profunde trisulcata, laevis, glabra, 2 mm. longa, 2 mm. lata, coccis rotundatis. *Semina* ellipsoidea subquadrangularia, apice basique rotundata, irregulariter foveolata, cinerea in foveolis nonnunquam nigris (immatura lutea vix foveolata), c. 1.5 mm. longa, 1 mm. lata, caruncula parva, mox decidua.

N. 'IRAQ. Dohuk–Mosul, c. 300 m., very common in cultivated fields, 10.10.31, *E. R. Guest* 1583 ; Al Qosh, 450 m., in a *Sorghum* field, 15.7.33, *do.* 3678 ; Mosul–Ain Sifni, 360 m., fields, 11.7.33, *do.* 4034 (type of *E. guestii*), 4035.

The following specimens are at Kew, not in the Rustam Herbarium :

ASIA MINOR. Beschabur, Mesopotamia, 1841, *Kotschy* 398 (syntype of *E. gaillardoti*) ; Anatolia, 1844, *Nož.*

SYRIA. Mejdal Anjar, 10.10.1860, *Hooker et Hanbury* ; Medjeel, Antilebanon, Feb. 1866, *H. Christy* ; between Haleb and the Euphrates in fields, 23.8.1893, *Bornmüller* 595 ; Ain-esh-Sha'arah, Antilebanon, 25.7.1892, *Post*, Herb. Kew. et Brit. Mus. ; Sanamayn [Sanamein], 800 m., fields, 27.6.1932, *J. E. Dinsmore* 11069.

Kotschy's, Hooker and Hanbury's, Post's and Dinsmore's specimens are too immature to have any seeds. They show the other characters of *E. guestii* including the characteristic purple tinge on the undersurface of the bract-leaves.

This species has been figured twice under the name *E. gaillardoti*. Once in Boissier's Ic. Euphorb. t. 69 (1866). The plate contains a large habit drawing of *E. guestii* in the centre with the leaf-serration rather exaggerated and also the smooth seeds of *E. gaillardoti* and a portion of an inflorescence on the left which might be intended for either species. The other illustration is a photograph in Boulomoy's Fl. du Liban et de la Syrie t. 398, fig. 2 (1930) ; this shows the bract-leaves and umbellate branching of *E. guestii*. In Boulomoy's text (p. 307) the seed are described as smooth, obviously in confusion with *E. gaillardoti* and presumably from another specimen than that figured.

The following new species may be described here, although not represented in the Rustam Herbarium.

E. unilateralis *Blakelock* sp. nov. ; ab *E. gaillardoti* Boiss. et Blanche inflorescentiae nodis supernis 4 vel pluribus unilateralibus, capsula globosa haud sulcata, seminibus majoribus nitidis, carunculis persistentibus differt.

Herba annua 40–50 cm. alta. *Caulis* crassiusculus, leviter striatus, glaber, rubro-suffusus, 4–5 mm. latus. *Folia* caulina evanida. *Inflorescentia* irregulariter corymboso-umbellata, radiis 5–14. *Inflorescentiae rami* leviter striati, glabri, rubro-suffusi, 3–8 cm. longi, bis ad quinquens dichotomi vel trichotomi nodis supernis 4 vel pluribus unilateraliter ramosi. *Bracteae foliaceae* orbiculares, triangulari-orbiculares vel late ovatae inferius ovatis, membranaceae, glabrae, in sicco virides, apicem versus denticulatae, apice carinato-mucronatae, basi truncatae vel rotundatae, 25–5 mm. longae, 16–6 mm. latae. *Cyathium* 1.5–2 mm. longum, glandulis transverse ellipticis. *Capsula* globosa, laevis, glabrescens vel sparsissime piloso-pubescens, 2–3 mm. longa, 2–3 mm. lata. *Semina* ovoidea subcompressa subcarinata, laevia, nitida, brunnea, c. 2 mm. longa, 1.5 mm. lata.

N. 'IRAQ. Sulaimaniya, 5–6.7.34, *H. Field and Yussef Lazar* 966.

ASIA MINOR. Mardin, Rischemil, Kurdistania, in vine-yards, 23.7.1888, *P. Sintenis* 1362 (type).

PALESTINE. Lake Hula, sea level, moist ground, 16.10.1935, *R. F. Jones* 184, Brit. Mus.

All three of these specimens had been previously named as *E. gaillardoti*. *Jones* 184 has the bract leaves longer than wide, in the other two specimens they are wider than long.

[*E. gaillardoti* Boiss. et Blanche Diagn. **2**, no. 4. 84 (1859) ; Boiss. ex DC. Prod. **15**, pt. 2, 118 (1866), Fl. Or. **4**, 1097 (1879) ; Boiss. Ic. Euph. t. 69 (1866) ; Bouloumoy Fl. Liban et Syr. texte, 307 (1930) excl. icon. ; Post Fl. Syr. Pal. and Sinai, ed. 2, **2**, 496 (1933) pro parte.

Inflorescence dichotomo-corymbose, branches dichotomous to apex. *Bract-leaves* orbicular or triangular orbicular, membranous, green when dried, base truncate or rounded, 12–3 mm. long, 14–3.5 mm. wide. *Cyathium* 1–1.5 mm. long. *Capsule* globose tricoccous, deeply trisulcate, smooth, glabrous, 1.5–2 mm. long, 1.5–2 mm. wide, lobes rounded. *Seed* ovoid, subterete, subcarinate, smooth, not shiny, brown, c. 1.5 mm. long, 1 mm. wide, caruncles small soon deciduous.

SYRIA. Raschaya, 1350 m., 7.7.1855, *Kotschy* 251, Kew and Brit. Mus. (syntype) ; Mejdeel Andjar, Antilebanon, 17.12.1816 [?], *Gaillardot* 2227.

TRANSJORDAN. Birkat Dàn, Sept. 1875, *Post* 37.

The reasons for confining the name *E. gaillardoti* to *Kotschy* 251 rather than to *Kotschy* 398 may be briefly indicated here. Boissier clearly regarded *E. gaillardoti* as having smooth dark-coloured seeds (Fl. Or. **4**, 1095, 1097). This applies to *Kotschy* 251 and *Gaillardot* 2227. The latter specimen is not cited by Boissier, but it is labelled *E. gaillardoti* in Boissier's handwriting. I assume it therefore to be a match for "Ouadi Barrada Antilebani, *Gaillardot*" cited in the Diagnoses l.c. as type material. *Kotschy* 398, which shows no seed, is in its other characters clearly another species and is here removed to *E. guestii*.]

The main differences between these three species are summarized below.

<i>E. gaillardoti</i>	<i>E. unilateralis</i>	<i>E. guestii</i>
<i>Inflorescence</i> dichotomous, branching to apex	corymboso-umbellate, unbranched at uppermost 4 or so nodes	corymboso-umbellate, branching to apex
<i>Bract-leaves</i> wider than long, base truncate or rounded.	wider than long or longer than wide, base truncate or rounded	longer than wide, base rounded
<i>Capsule</i> grooved	not grooved	grooved
<i>Seeds</i> smooth, brown, 1.5 mm. long.	smooth, brown, 2mm. long	foveolate, grey, 1.5 mm. long
<i>Caruncle</i> caducous	persistent	caducous

***E. helioscopia* L.**

Diana nr. Rowanduz, 26.3.30, 708 ; Baghdad, in date gardens at Karada, native name khunnaiq-ad-dijāj, 20.2.31, 1087 ; Amadia, 1020 m., 28.3.31, 1216 ; Dohuk, in a peach garden, native name um-al-halīb, 26.4.32, *Yussef Lazar* 3366.

***E. peplus* L.**

Baghdad (in a Karada date garden), 20.2.31, 1086 ; do., 24.2.33, *Yussef Lazar* 3877.

***E. petiolata* Banks et Sol. (*E. lanata* Sieb.).**

Bad'a (N. of Baghdad), native name um-al-halaib (= "mother of milk"), 26.5.32, 2495 ; Arbil, 440 m., on stony red loam in cultivated fields (fallow), 17.7.32, 2998 ; Rustam, native name um-al-halīb, 4.6.32, *Yussef Lazar* 3425 ; Hatra, among the ruins, poisonous to animals, native name sahal, 17.10.32, 3561.

***E. pilulifera* L.**

Baghdad, 20.11.20, *Paranjpye* 20.

***E. teheranica* Boiss.**

Balad Sinjar-Tal Afar, 330 m., on semi-natural steppe, 28.4.33, 4170.

***E. tinctoria* Boiss. et Huet.**

Diana nr. Rowanduz (Kurdistan), 750 m., 12.10.31, 496 ; Khanzad Pass (nr. Arbil), 480 m., on stony hill-side, 17.4.32, 2013 ; Arbil, 420 m., in a cornfield on red loam, 20.4.30, 2131 ; Chia-i-Mandali (Walash to Walza), 1200-1800 m., very common on the hill-side, brilliant yellowish green, native name shi'arak, 18.7.32, 2656 ; nr. Ain Sifni, 450 m., stony hill-side pastures, 12.7.33, 4043 ; Atrush, Kurdistan, 885 m., on red marl banks in open pine forest, 13.7.33, 4397 ; Badi nr. Dohuk, 825 m., on open hill-side, 25.7.33, 4415 ; Zawita Valley, 825 m., on red marl banks, 25.7.33, 4435 ; Zawita, 840 m., on rocky mountain ridge, 26.7.33,

4489 ; do., 1200 m., on rocky plateau, 28.7.33, 4576 ; do., 720 m., on red limestone scree soil, 29.7.33, 4742 ; Ser Amadia, 1770 m., on mountain side, 3.8.33, 4976.

Some of these are var. *schizoceras* Boiss. ex DC. Prod. **15**, pt. 2, 166 (1862).

E. virgata W.K. var. **orientalis** Boiss.

Chia-i-Mandali, 1950 m., in a ditch by a cornfield, 20.7.32, 2768.

Euphorbia sp.

Nr. Tauq, 195 m., on steppe soil, 13.4.33, *Guest, Eig and Zohary* 5095.

Material too immature for identification.

URTICACEAE.

Broussonetia papyrifera (L.) Vent.

Baghdad (Hinaidi) ornamental trees in No. 1 Mess Garden, 30ft. high, doubtless alien, 30.6.32, 1792.

Celtis australis L.

Rustam (alien), 15.3.31, 1122.

C. tournefortii Lam.

Shaikh Adi (N. of Mosul), 825 m., native name tawak (K.), 10.10.31, 1644 ; Amadia, 1350 m., at the foot of Gulli Mazurka, 3.8.33, 4992.

Ficus carica L. var. **rupestris** Hausskn. ex Boiss. Fl. Or. **4**, 1154 (1879) (det. V. S. Summerhayes).

Zakho Pass (N.W. of Mosul), 750 m., on mountain side, 24.4.32, 2247 ; Zawita, 1110 m., in pine forest on rocky limestone slope, 27.7.33, 4504 ; Zawita, 1065 m., in pine forest on limestone crags, 30.7.33, 4766.

The numerous varieties of *Ficus carica* L. tend to pass into one another, but the gatherings cited all appear to be referable to the above variety. The leaves vary considerably in the amount of indumentum and also tend often to be more or less shortly lobed, not always undivided as suggested in Flora Orientalis.

Morus alba L.

Rowanduz Gorge (Kurdistan), 600 m., 12.10.31, 459 ; Rustam Farm, cultivated for feeding silk-worms, native name tûth or tukg, 20.3.32, *Yussef Lazar* 1828, 1828A ; Arl Gird Dagħ (at Nawanda), 1500 m., large trees at the village, fruit white, 20.7.32, 2777.

M. nigra L.

Arl Gird Dagħ (at Nawanda), 1500 m., large trees at the village, fruit black, 20.7.32, 2775.

Parietaria alsinefolia Del.

Makhlāt, 165 m., among rocks under small cliff, 29.4.33, 4279.

P. judaica L.

Rowanduz Gorge, 600 m., 12.10.31, 493 ; do., on rocks near a waterfall, 18.4.32, 2091 ; Dohuk, 450 m., on a rocky cliff, 22.4.32, 2173 ; Rowanduz Gorge, 600 m., on a rocky cliff, 25.7.32, 2970 ; Dohuk Gorge, 450 m., on a limestone cliff, 25.7.33, 3707.

These show larger leaves than most specimens of *P. judaica* in Herb. Kew., but they closely resemble, 3707 especially, *Kotschy* 329 from Mt. Gara.

***P. lusitanica* L.**

Makhlāt, 165 m., among rocks under small cliff, 29.4.33, 4279A.

***Ulmus* sp.**

Ryatt Valley (foot of Arl Gird Dagħ), 1050 m., by stream in the valley, small tree, 20.7.32, 2773.

Dr. Melville may be describing this as a new species.

***Urtica dioica* L.**

Chia-i-Mandali (nr. Walash), 1350 m., 18.7.32, 2650 ; Arl Gird Dagħ (nr. Nawanda), 1800 m., by a stream, 20.7.32, 2781 ; Zawita, 900 m., damp places, ditches, etc., in gardens, 27.7.33, 3748.

***U. pilulifera* L.**

Makhlāt, 165 m., among rocks under small cliffs, 29.4.33, 4283.

PLANTANACEAE.

***Platanus orientalis* L.**

Bursorini Gorge (Kurdistan), large spreading trees, growing in the valley, native name chinār, 12.10.31, 462 ; Shaqlawa, Kurdistan, 23.3.30, 568 ; Amadia Valley (Kurdistan), 750 m., fine spreading trees by the mountain streams, 31.3.31, 1330 ; Bursorini Gorge (Kurdistan), 750 m., 10.10.31, 1566 ; Shaikh Adi, 750 m., by the stream, fine spreading trees, 3662.

JUGLANDACEAE.

***Juglans regia* L.**

Rowanduz Gorge, 450 m., fair sized tree, 20.4.32, 2142 ; Ryatt Valley, 900–1200 m., by streams near villages, large well grown walnut trees, 20.7.32, 2751 ; Shaqlawa, 900 m., in orchards near the villages, large well grown walnut trees, 17.7.32, 3009.

CASUARINACEAE.

***Casuarina cunninghamiana* Miq.**

Rustam, grown from imported seed, not indigenous, Dec. 31, 331, 332.

CUPULIFERAE.

***Quercus aegilops* L. s.l.**

Rowanduz, Kurdistan, 25.3.30, 584 ; Amadia, 750 m., by a mountain stream in the main valley, 31.3.31, 1332 ; Marmar Mt. (nr. Rowanduz), 1200 m., on mountain side, small tree with mistletoe growing on it (see 2064, *Loranthus europaeus*), 19.4.32, 2064A ; Seri Hassan Beg, 1650 m., small trees forming open forest on the hill-side, 24.7.32, 3031, 3033 ; Iskeftendiwan, nr. Shaikh Adi, 750 m., in a graveyard, fine spreading tree 20–30 ft. high, 14.7.33, 3667 ; Zawita, 600 m., on rocky (limestone) slope, 27.7.33, 3736 ; Zawita Valley, 825 m., on red marl banks, 25.7.33, 4432 ; Zawita range, 1050 m., on rocky mountain slope, 25.7.33, 4462 ; do., 840 m., on rocky mountain slope, 26.7.33, 4487 ; do., 1070 m. in clump of pines by a flat outcrop of limestone terraces, 28.7.33, 4553 ; do., 1200 m., on rocky plateau, 28.7.33, 4570 ; do. 1080 m., in pine forest on steep rocky slope, 28.7.33, 4624 ; do., 990 m., in small rocky ravine, 30.7.33, 4777 ; do., 1065 m., in oak forest, 1.8.33, 4937.

These specimens show only vegetative parts or immature fruit, so that it is impossible to decide in which subspecies they should be included. I am indebted to Messrs. G. Chapman, Forest Officer and J. B. Gillett, late Department of Agriculture, 'Iraq, for much information on the

ecology and economics of the oaks in 'Iraq. This information is given in the notes below, separately from Mr. Guest's field-notes attached to the specimens. *Q. aegilops* is the most widespread oak in the country and the only species present in the drier parts (e.g. Jabal Sinjar).

Q. vesca Kotschy is regarded by Camus (Les Chênes **1**, 524 (1936-8), as a possible hybrid of *Q. libani* and *Q. aegilops* subsp. *brantii*. Examination of type material (Kotschy 555) confirms this view. A specimen without acorns (Kuh-Sefin, Schaklava, nr. Erbil, 12.5.1893, Bornmüller 1818), which had been named *Q. vesca*, is better regarded as *Q. aegilops* L.s.l. Mr. Gillett tells me that *Q. libani* does not occur near Schaklava, where the hills are too low and too dry. *Q. oophora* Kotschy is also tentatively given the same hybrid origin by Camus, and again type material at Kew (Kotschy 554) confirms this opinion.

Q. aegilops L. subsp. ***brantii*** (Lindl.) Camus in Les Chênes **1**, 544 (1936-8).

Bursorini Gorge, Kurdistan, 750 m., native name balût, 12.10.31, 465 ; Rowanduz Gorge, Kurdistan, 600 m., native name balût, 12.10.31, 489 ; Suwara Tuka, 1200 m., 10.10.31, 1576.

These show the broad acorn characteristic of subsp. *brantii*, certainly the common subspecies in 'Iraq.

Subsp. *persica* (Jaub. et Spach) Blakelock stat. nov. is not represented in Rustam Herbarium. Its occurrence in 'Iraq, while probable, is not proved by any specimen in the Kew Herbarium. Kotschy's specimen from Gara, which is cited by Jaubert and Spach in the original description of *Q. persica* (Ill. Fl. Or. **1**, t. 55 (1843)), was collected in August and shows no fruit. It therefore cannot be positively stated, that this specimen is not subsp. *brantii*, which is certainly common in that area. Mr. Gillett has seen only one specimen apparently of subsp. *persica* from Salahaddin, Pirmum Dagh, 'Iraq ; this has not yet arrived at Kew. It is to be noted that Camus l.c. figures the extremes in acorn-shape of these subspecies. Material from Persia is available with the acorn more or less intermediate in shape.

DISTR. (of subsp. *brantii*) Asia Minor, N. 'Iraq.

(of subsp. *persica*) N. Iraq ?, Persia.

(of entire species) S. Italy, Balkan Peninsula, Asia Minor, Syria, Palestine, N. 'Iraq, Persia.

Quercus infectoria Oliv.

Bursorini Gorge, Kurdistan, 750 m., 12.10.31, 464 ; Suwara Tuka, 1200 m., gall oak, native name afs, 10.10.31, 1575 ; Rowanduz Gorge, 750 m., 18.4.32, 2099 ; Marmarut Mt. (nr. Rowanduz), 750-1350 m., on the mountain side, small tree, 19.4.32, 2087 ; Ryatt Valley, 450 m., on the open hillside, small trees about 20 ft. high, 20.7.32, 2747 ; Seri Hassan Beg, 1650 m., small trees forming open forest on the hill side, 24.7.32, 3030, 3032, 3034 ; Iskeftendiwan, nr. Shaikh Adi, 750 m., in a graveyard, fine spreading tree 20-30 ft. high, 14.7.33, 3668 ; Zawita, c. 900 m., 25.7.33, 3700 ; Zawita Valley, 945 m., among limestone crags, 25.7.33, 4449 ; Zawita, 1050 m., in pine forest on N. slope, 27.7.33, 4507 ; do. 1010 m., in oak forest on steep rocky slope, 28.7.33, 4619 ; do., 1020 m., in pine forest on steep red marl slope, 28.7.33, 4639.

These specimens show a great variation in leaf shape and margin from deeply sinuate-lobate to entire. They all appear to belong subsp.

boissieri (Reuter) Gürke (see Camus l.c. 2, 187 (1938)). *Q. pfaeffingeri* Kotschy is only a form of this with entire or subentire leaf-margin (e.g. Guest 3668, Bornmüller 1811). There is type material of *Q. pfaeffingeri* at Kew.

Q. infectoria is intermediate in its moisture requirements between *Q. libani* and *Q. aegilops*. Where the conditions are suitable (e.g. near Rowanduz) it is about as common as *Q. aegilops*.

DISTR. Macedonia, Thrace, Asia Minor, Cyprus, Palestine, Syria, N. 'Iraq, N. Persia.

***Q. libani* Oliv. (*Q. regia* Oliv.).**

Seri Hassan Beg, 1800 m., on the mountain side, large tree 40 ft. high with a good bole, 24.7.32, 2898; Ser Amadia, Kurdistan, c. 1800 m., oak branches used for making shelters on summer camping grounds, native name dindār (or dildār (K)), 2.8.33, 3784.

Q. regia Lindl. Bot. Reg. 1840, no. 73 is a synonym of *Q. libani*. Type material (Kurdistan, 1840 Brant) is at Kew. Handel-Mazetti formed the same opinion from a specimen collected by Kotschy (in Ann. K. K. Nat. Hofmus. 26, 128 (1912)). He described a *lusus pinnata* Hand.-Mazz. l.c. with the leaves pinnatifid into remote unequal long linear or triangular-linear segments, as wide as the primary lamina and confluent towards the base of the leaf. Nábělek collected a specimen of this *lusus* between Hasitha and Amadia on the Turkey-'Iraq frontier (in Publ. Fac. Sci. Univ. Masaryk 105, 23 (1929)).

The bole is more erect, smoother and less branched in *Q. libani* than in *Q. aegilops* or *Q. infectoria*. It occurs in the cooler damper climates of the higher mountains, where it may be dominant, especially in the N.E. corner of 'Iraq.

DISTR. Asia Minor, Syria, N. 'Iraq.

***Q. macranthera* Fisch. et Mey.**

Seri Hassan Beg, 1800 m., on the mountain side, large well-grown tree about 40 ft. high with good bole, 24.7.32, 2899.

This is the only specimen seen from 'Iraq. In view of the amount of material available of the other oaks, it is obviously not a common species; probably confined to the higher and damper zone of the forest.

DISTR. Caucasus, Asia Minor, N. 'Iraq, N. Persia.

Guest's records of *Q. petraea* (Mattuscha) Liebl. (*Q. sessiliflora* Smith) and *Q. castaneifolia* C.A.M. are misidentifications (in Dept. of Agric. 'Iraq Bull. no. 27, 82 (1933)).

There are four vernacular names in general use for oaks in 'Iraq—

Afus (af's) is really the name of one of the numerous types of gall, well known and of economic importance as a tanning agent. The name is connected with the widespread (classical?) Arabic name of the Cypress, whose cones show some resemblance to this gall. The galls only occur on *Q. infectoria* and the name afus is secondarily used for this species. Māzi or mazī is the Kurdish name for this species.

Balūt is properly speaking the name for the acorn, and is sometimes

applied to the fruit of any species of *Quercus*. As, however, the acorn of *Q. aegilops* is the largest, is used as food and the cup as a tanning agent, the name is secondarily applied to this species. Barū is a Kurdish form of the word balūt. *Quercus balout* Griff. is a native of Afghanistan not of 'Iraq.

Dindar is the chief of several Kurdish names for *Q. libani*.

All species are used for charcoal (of great importance in 'Iraq) and to a lesser extent for timber and firewood. The timber is generally small, twisted and of poor quality. The leaves of *Q. infectoria* are much cut for winter fodder and the trees near the villages are usually pollarded on that account. *Q. aegilops* may be used less often for the same purpose, where *Q. infectoria* does not occur. Manna in 'Iraq is a sugary excretion produced as the result of an insect attack on the leaves of *Q. aegilops*, it falls on the dead leaves and stones below the trees and is thence collected, boiled to remove twigs, small stones, etc., and sold in Baghdad and elsewhere at a good price as a sweetmeat. The acorns of *Q. aegilops* are also sold in Baghdad as a food ; they are rather bitter and indigestible and regarded as a food for the poor.

A key to the species of *Quercus* found in 'Iraq is given below—

- A. Leaf-margin sinuate-lobate to entire, (if mucronate, mucrones up to 0.5 mm. long). Styles short, dilated and flattened at the apex.
 - B. Stipules persistent, linear, silky hairy ; bud scales pubescent. Mature leaves sparsely stellate-pubescent above, stellate-tomentose below, lamina up to 10 cm. or more long.
 - macranthera* F. et M.
 - BB. Stipules not persistent ; bud scales pubescent or glabrous. Mature leaves glabrescent to stellate-pubescent, less pubescent above, lamina up to 9 cm. (rarely 10 cm.) long but usually smaller *infectoria* Oliv.
- AA. Leaf-margin dentate, markedly mucronate (mucrones up to 1-3 mm. long). Styles subulate at apex.
 - C. Mature leaves lanceolate, glabrous, glabrescent or sparsely stellate-pubescent, shining *libani* Oliv.
 - CC. Mature leaves ovate, oblong or oblong-lanceolate, stellate-tomentose below, stellate-pubescent above *aegilops* L.
 - D. Acorns ellipsoid tapering at both ends, 1.8-4 cm. long, 1.2-1.5 cm. wide, cupule obconic *aegilops* subsp. *persica* (Jaub. et Spach) Blakelock
 - DD. Acorns ovate or subcylindric, less tapering at the ends 3-4.5 cm. long, 1.8-2.7 cm. wide, cupule hemispherical
 - aegilops* subsp. *brantii* (Lindl.) Camus.

SALICACEAE.

Populus alba L.

Baghdad, May 32, 2545 ; Chia-i-Mandali, 1350 m., in a hedge near a village, trees 20 ft. high, 20.7.32, 2758.

P. euphratica Oliv.

Amadia, 750 m., by a stream in the main valley, 31.3.31, 1331 ; Rustam, common in thickets along the Diyala river, native name gharab, 4, 13,

28.3.31, *Yussef Lazar* 1494, 1494A, 1494B ; Jindian (Kurdistan), 750 m., 12.10.31, 1549.

***Salix acmophylla* Boiss.**

Rustam, 7.3.31, *Yussef Lazar* 1414 ; Rustam, on channel banks (cultivated), also found in natural thickets on the Euphrates, etc., native name safsāf, Feb. 32, *do.* 3317 ; Baghdad, roadside avenue at Rustam (planted) and in a grove along the Diyala River at Rustam, 9.3.33, *do.* 3915, 3916, 3917.

Handel-Mazetti has a note on this species, in which he sinks *S. persica* Boiss. (in Ann. K.K. Nat. Hofmus. **26**, 128 (1912)). Only male catkins have been seen from Iraq.

***S. acmophylla* Boiss. ?**

Bursorini Gorge (Kurdistan), 750 m., growing in the bed of the stream, 12.10.31, 463 ; Ryatt Valley (foot of Arl Gird Dagħ), 1050 m., by a stream, 20.7.32, 2772.

These specimens show only vegetative parts. Both are heavily galled. The leaves match those of *Kotschy* 400 cited by Boissier (Fl. Or. **4**. 1183 (1879) as this species.

***S. aegyptiaca* L. (*S. medemii* Boiss.).**

Amadia (Kurdistan), 1050 m., 26.3.21, 1227.

***Salix* sp.**

No precise locality, Mar. 30, 757.

Possibly a hybrid of *S. babylonica* with *S. alba* L. or *S. acmophylla*.

CERATOPHYLLACEAE.

***Ceratophyllum demersum* L.**

Amara marshes, submerged water weed, native name shinbilān, 13.12.31, 1562.

The Botany of Tropical Africa.

A meeting of botanists working on the taxonomy of tropical African plants was held at the Herbarium, Royal Botanic Gardens, Kew, on 15th September 1950, both with a view to improving the co-operation in that field and to correlating the African regional floras now in course of preparation at the British Museum, Brussels and Kew. Twenty-one botanists were present representing six institutions and four countries. A resolution was unanimously passed forming an Association for the taxonomic study of the flora of tropical Africa. A full account of this meeting, together with the detailed aims of the Association, will shortly be circulated to all plant taxonomists known to be working on tropical Africa. Anyone interested, who does not receive the full account by the end of May 1951 is asked to communicate with the Secretary, Mr. D. R. Meikle, The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey.

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